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California Subcommittee On Acceleration

THE coördination of acceleration programs of schools and colleges has become a matter of great urgency. It is considered important, therefore, that a plan of acceleration be worked out which will harmonize the specific functions of high schools and colleges. Consequently, the California Committee for the Study of Education recently authorized the appointment of a subcommittee to study the problem and to make recommendations at an early date. The personnel of the California Subcommittee on Acceleration is as follows:

NORTHERN SECTION

William F. Ewing, Oakland City Schools.
A. J. Cloud, San Francisco Junior College.
Earle E. Crawford, Glenn County High School, Willows.
Aubrey A. Douglass, State Department of Education.
Harry Hansell, Presidio Junior High School, San Francisco.
William F. Meyer, University of California.
J. P. Mitchell, Stanford University.
Leroy Nichols, Lodi High School.
Pedro Osuna, Marysville Union High School.
Father Ralph, F. C. C., supervisor of schools, Peralta Park, Berkeley.
Alexander C. Roberts, San Francisco State College.

SOUTHERN SECTION

W. D. Bannister, Oxnard Union High School.
Grace V. Bird, Bakersfield Junior College.
Charles J. Booth, Chaffey Junior College, Ontario.
Florence N. Brady, Occidental College.
Harold Brooks, George Washington Junior High School, Long Beach.
Arthur Gould, Los Angeles City Schools.
John W. Harbeson, Pasadena Junior College.
Arthur G. Paul, Riverside District Junior College.
J. Edward Sanders, Pomona College.
Thompson Webb, Webb School of California, Claremont.
Hugh C. Willett, University of Southern California.

Dr. Merton E. Hill, director of admissions, University of California, is to serve as chairman.

A report on what the Subcommittee has accomplished to date is included in Dr. Douglass' "What's Happening in California Secondary Schools" column of this issue.

Next Month

ANOTHER symposium dealing with a phase of education during war times is scheduled for the February JOURNAL. Entitled "Wartime Adult Education in California," it describes a number of important adult programs that are being conducted in the State, and it also serves to emphasize the changed status of adult education today.

In most localities adult education two or three years ago was just an extra so far as public education was concerned. Adult administrators and teachers alike did not have quite the status that those in the day schools were accorded. All too often, the adult schools themselves were given what was left after the rest of the system had been satisfied. But today all this is different. Adult education now is a vital part of our war effort. It is making an indispensable contribution in the whole conversion of

industry to war needs, and it is playing an important part in civilian defense and in the building of civilian morale.

This whole change in the status of adult education is described in an excellent opening article by George C. Mann, chief of the Division of Adult and Continuation Education, State Department of Education.

Elmer Jones, assistant superintendent in charge of adult education in Long Beach, describes how a large community uses its adult education program to mobilize its services in time of war. Paul E. Klein, director of adult education in San Diego, tells how his community is utilizing its educational facilities to handle the great influx of workers to the community. The problems of the small community—and the problems of adult education in a small community are distinct from those in a city—are discussed by Calvin C. Cope, principal of the evening school, Pacific Grove.

Paul D. Thomas, principal of the Central Trade Evening School, Oakland, tells how his school is training men in uniform for the armed services. Besides the more spectacular services that adult education is rendering today, it is continuing the important program of social-civic education. This topic is discussed by Leo Jones, coördinator of federal educational projects for the Division of Adult and Continuation Education, State Department of Education.

Much of California's adult education program is carried on through the evening high schools, but two other levels of the school system are prominent in the picture today—the junior colleges and the universities. The role of these schools in war training is discussed in two articles—one by J. E. Carpenter, principal of the Sacramento Evening Junior College, and the other by Mrs. Bernice Hubbard May, coördinator of women's training, University of California War Training Program.

An elaborate plan for an after-war program in adult education is described by David L. MacKaye, principal of the San Jose Evening High School and director of adult education in San Jose.

The symposium has been organized by F. Milton Yockey, principal of the Technical Evening High School, Oakland. Dr. Yockey writes the editorial for this issue.

Other articles in this number include a contribution from Merton E. Hill, director of admissions, University of California. In it he discusses the whole problem of giving young men a chance to enter college or university before being drafted and makes certain intimations as to the policy to be followed by the University of California.

Two important articles in the field of guidance are included. The first, entitled "Guidance Needs to Become a Reality," is written by W. J. Klopp, supervisor of secondary education, Long Beach. The second, by Norman Schachter, teacher of the Redlands Senior High School, is called "School Guidance for War Vocations."

A New Life Member

THE California Society of Secondary Education is pleased to announce that it has a new life corporate member. Dr. Cornelius H. Siemens, assistant professor of education at the University of California, has added his name to the list of those who, in supporting the Society and its publications during the formative years of secondary education in California, have made a most important contribution to the secondary schools of the State.

Dr. Siemens it is who assisted with the planning of the symposium contained in this issue of the JOURNAL and himself contributed an important article.

Preflight Aeronautics in California Schools

By FRANK B. LINDSAY

In charge of the rapidly developing preflight courses in the public high schools of California is Mr. Lindsay, assistant chief of the Division of Secondary Education, State Department of Education. In this article Mr. Lindsay indicates the form which the preflight courses are taking over the State, and he renders the invaluable service of cautioning that preflight training in the high schools must be in the nature of a changed emphasis, a reorganization and redirection of much that we already have, but not a general discarding of those areas which experience has taught us are the fundamentals of high school education.

Before going to the State Department, Mr. Lindsay was dean of men and chairman of the Division of Engineering and Mathematics at the San Bernardino Valley Junior College.

IN the late spring and summer of 1942 the United States Office of Education issued Leaflet No. 62, *Pre-Aviation Cadet Training in High Schools,* and Leaflet No. 63, *Pre-Flight Aeronautics in Secondary Schools,* to guide high schools in organizing basic training in mathematics, physics, physical fitness, and specialized courses dealing with particular phases of aviation. During the 1942-summer session, the University of California held workshops at Berkeley and Los Angeles for training teachers in preflight aeronautics; at several other places in the State similar study groups assembled. At the beginning of the autumn semester, more than half of the senior, four-year, and six-year high schools opened courses in preflight aeronautics; evidencing the interest of pupils, enrollments generally were heavy.

The typical course in preflight aeronautics is two semesters in length and includes aerodynamics or theory of flight, meteorology, and navigation. Additional units on engines or radio and radio communications are given when there are a competent instructor and adequate school equipment. A number of smaller high schools do not have a separate course in the subject, since their limited enrollments do not justify this step, but have incorporated into physics or physical science much material from phases of aviation.

The extremes can be illustrated by a high school with a total student body of fifty which teaches merely aircraft identification and simple meteorology and the Los Angeles City High School District with its numerous centers for teaching aircraft sheet metal work, engine maintenance and repair, propeller mechanics, carburetion, electrical systems, aircraft drawing, blueprint reading, aircraft instrument installation, hydraulic systems, aerial photography, and factory production methods in four-year sequences of comprehensive, intensive training.

OUTLINES of courses have had to be tentative until instructors gained experience through actual teaching and the interest and ability of the majority of enrollees in each high school community have been explored. There is no doubt, however, that the public high schools of California are

rendering able and conscientious service in preflight aeronautics instruction —just as they have met other wartime demands for manpower and womanpower for military and industrial service and for the harvesting of farm crops. At the outset there was some confusion of preflight aeronautics instruction with the courses in pilot training which junior colleges had been conducting under the auspices of the Civil Aeronautics Administration. As its name implies, preflight aeronautics deals with the background of nomenclature and principles of aerodynamics, aerial navigation, and meteorology which a student needs before he attempts flight training.

Almost all high schools require pupils to have had algebra and plane geometry before attempting preflight aeronautics, but able twelfth-grade pupils frequently are admitted without reference to prerequisites since it has been considered imperative to provide them as much training as possible in advance of entering military service. On the other hand, many high schools demand that pupils must have had trigonometry and physics prior to enrolling

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Nothing ever before has happened in secondary education quite like the present all-out effort to make aviation-conscious the high school youth of America. Almost over night, thousands and thousands of preflight courses have sprung up in high schools all over the country. New texts and teaching materials have appeared almost by magic. Teachers have prepared themselves to teach new courses, and they have revised old courses to use aviation as motivation and as a center of interest. Already an unbelievably large number of boys and girls are enrolled in these classes, and it is predicted that within the next few years we will be giving preflight instruction to most of the boys in our high schools. With all these developments in progress, it is time to report in symposium form what California high schools are doing in preflight aeronautics.

The symposium opens with an article by Frank B. Lindsay, assistant chief of the Division of Secondary Education, State Department of Secondary Education. Following this comes an out-of-state contribution from Edgar Fuller of the School of Education, Harvard Graduate School, tracing the development of aviation education in the secondary schools. Because of the confusion that often exists as to the relationship of the preflight program to Civilian Pilot Training, Theron S. Taber Jr. of Bakersfield Junior College has the task of describing the CPT program and of showing its relation to preflight aeronautics.

Maurice G. Blair, director of the Secondary Curriculum Section, Los Angeles, describes the preflight program in a large city; and two principals, L. W. Richards of Biggs Union High School and E. O. Talbott of Los Molinos Union High School, show how the program is working in the small schools of the State. Stanford Hannah, district superintendent of the Taft Union High School and Junior College, reviews administrative problems involved in the introduction of a preflight program. But administrative difficulties do not present the only problems; accordingly, George Howden, principal of the Selma Union High School, discusses the matter of making necessary equipment or of securing it at low cost. Cornelius H. Siemens of the University of California, Berkeley, writes an article that should be read by every teacher of preflight aeronautics. In it he discusses the whole problem of teaching in this field, offering suggestions as to aims, methods, and materials.

The symposium is presented at the suggestion of and with the help of Professor Siemens. Mr. Lindsay, who represents the State Department in the direction of the program in California, also was of great assistance in the planning of the contents.

in the course; some permit the student to take physics and the aeronautics instruction concurrently. This has resulted in a variety of courses of markedly differing degrees of technical difficulty.

The Division of Secondary Education and the Subcommittee on Science of the California Committee for the Study of Education are working to secure greater uniformity of content and emphasis in preflight aeronautics. It is likely that in another year the course will become more standardized as generalized aviation concepts, loosely indicated by the unlucky phrase "air-conditioning," become incorporated into preliminary subjects of general education.

TO illustrate the manner in which this is occurring, a preliminary progress report by the Curriculum Coördinating Committee of the Redlands City Schools indicates how the schools of that community are attempting to organize a comprehensive program of education for the air age. The committee declares:

> The students and teachers of the Redlands schools in common with all Americans everywhere should become cognizant of the great importance of air power and should become air conditioned in thought and knowledge in order to be prepared for the air age.

Noting that in general students are more aviation conscious than their teachers, the committee, in a mimeographed bulletin submitted by Superintendent John Branigan, suggests current books on aviation for teachers to read; directs their attention to articles appearing in *Reader's Digest, Time,* and *Life;* and has helped to organize an open forum on rudiments of aviation and plane recognition conducted by the high school teacher of preflight aeronautics. From a section on methods and materials the following is condensed:

> Social studies might emphasize the airplane in normal activities, new geography, and the local community in the air age.
>
> In geography, youngsters should become familiar with the global concept and polar projection maps.
>
> Science might emphasize the air, weather, and principles of flight.
>
> English will be motivated if aviation literature is included. There is a lot of good biography based on men prominent in the history of aviation.
>
> It may be of interest to other teachers to know that the high school pre-flight training consists of thorough conditioning in physical education; a solid foundation of mathematics and science through and including physics and trigonometry; and the aeronautics course which takes up airplane structures, types, flight regulations, engines and fuels, instruments, communications, meteorology, and navigation.

At Redlands Junior High School social living classes give two weeks to the government publication, *Recognition of United States Aircraft,* a copy of which is available for every student. The ninth-grade unit on Latin America studies the great advances made by Latin American countries through air facilities. The seventh-grade science unit on Air includes the composition of the atmosphere and world-wide wind circulation. Weather movements and forecasting are stressed for the eighth grade; in ninth-year general science, aviation uses motivate the study of radio, electricity, sound, and light. It is evident that junior high school pupils who obtain this background in aviation will enter courses of senior high school mathematics and science with more readiness for attempting technical aspects of these subjects.

IF high schools are to serve the needs of the army, navy, and war industries, with particular reference to aviation, principals and teachers will remember that their first and foremost responsibility is to do as well as pos-

sible the job for which public secondary schools are maintained and which they of all agencies can do best, namely: continue the development of mastery of fundamental skills and knowledges in arithmetic, other elementary mathematics, physical science, and reading and English expression, and of allegiance to American ideals. Whatever more can be done in any school is very useful, of course, but focusing upon preflight aeronautics must not lessen emphasis upon the primary task.

The regular curriculum of the public high school has been devised over years precisely because it has been of most service to the majority of young people. To minimize its importance in order to attempt to instruct in aspects of aviation is to fail youth, the military forces, and the nation. Education for the air-age is not an addition or replacement of essential subject matter but rather is the utilization of live materials to achieve long-recognized objectives. The citizen of the air-age still has responsibilities to assess economic and social issues and to participate in the practices of the American political system. A competent workman must know better than ever before how to read with full comprehension and to write and speak concisely and lucidly.

The United States is an area of extraordinary industrial resources, now producing under the stress of war in unprecedented volume. The air-age greatly expands but does not supersede the age of waterways, railroads, and truck lines. Is it not the part of education to help young people not merely to master the technical prerequisites for the full utilization of aviation inventions but to aid them in seeing aviation in relation to other industrial developments?

In point is the recent statement of President William Allan Patterson of United Air Lines to the National Industrial Conference Board: "The average freight train between Chicago and San Francisco makes two round trips per month, delivers 1,560 tons of freight each way. The round trip operating cost is $50,000, the locomotive consumes 170,000 gallons of oil, the train crew numbers 20. To move the same tonnage by air would call for 626 airplane round trips by 57 airplanes, gasoline consumption would be 1.5 million gallons, pilots needed 400; total operating cost 1.75 million dollars."[1]

[1] *Time*, December 7, 1942, page 89.

Employment Age for Girls Lowered

The Labor Department opened the gates of war plants last month to girls 16 and 17 years old. Secretary of Labor Frances Perkins, under authority of the Walsh-Healey Public Contracts Act which permits her to exempt employers from the 18-year age limit for women on Federal contracts, dropped the age requirement to 16 to permit more girls to take their places on the production lines.

She acted at the request of the War and Navy Departments and the Maritime Commission. The agencies found that continuation of the limit would retard essential production and interfere with the successful prosecution of the war.

The secretary made these conditions for the employment of 16- and 17-year-olds: No girl under 18 shall be employed for more than eight hours in any one day, or between the hours of 10 p. m. and 6 a. m.; no girl under 18 shall be employed in any operation or occupation hazardous in nature or dangerous to health; specific luncheon periods of at least 30 minutes must be granted; and girls must receive at least the minimum hourly rate set by the Fair Labor Standards Act or the Walsh-Healey Public Contracts Act.

Development of Aviation Education

By EDGAR FULLER

A CENTURY and a half ago, the Constitutional founders of our nation made the regulation of interstate commerce a responsibility of the national government. The experiences of the American colonies, and especially the bitter controversies over internal tariffs during the years the Articles of Confederation were in effect, had made obvious the desirability of this constitutional provision.

Yet Madison and his colleagues, great as their vision was, could hardly have foreseen the full implications of this part of their work for our society of today. There were few facilities of interstate transportation or communication to regulate in 1789. The first locomotive railroad in the United States began operations in 1829, the first commercial telegraph came in 1839, the first practicable telephone was made in 1876, and there were less than 33,000 automobiles registered in the United States when the Wright brothers flew at Kitty Hawk in 1903.

It is easy to illustrate how this rapid development of communications and transportation across state lines has been reflected in our structure of government. Regulation of the railroads had become so important by 1887 that Congress created the Interstate Commerce Commission for the purpose. Interstate trucks and buses only added to the work of the Commission. Similarly, the obvious necessity for coordinating radio broadcasting finally produced the Federal Communications Commission as the successor of a series of less grandly conceived agencies for the regulation of communications.

As this article points out, the regulation of aviation is a national concern, for the airplane has reduced distances and encouraged the centralization of government. It is fitting, therefore, that the present symposium on preflight training should include an article dealing with the national picture.

Dr. Fuller, lecturer on educational administration in the Harvard Graduate School of Education, is widely known for his work in preflight aeronautics. He has met with state and local officers of schools in more than thirty states during the past nine months to discuss with them the rapidly developing aviation program, has made some sixty speeches on the topic, has taught aviation education in a university workshop, and so on. He is the author of numerous articles, including several on aviation education. Before going to Harvard, Dr. Fuller was a junior college president; and prior to that he had been, successively, a teacher, high school principal, and superintendent of schools.

Such clear cases of regulation of interstate commerce do not, however, indicate the real influence of the commerce clause. The fact is that Congress and the Supreme Court have extended its application to matters which are interstate commerce only by legislative and judicial definition. The Federal regulatory power early was interpreted to include all activities which "directly affect" interstate commerce. During the past several decades the word "directly" has been defined with increasing liberality, so that the scope of interstate com-

merce is now extremely broad. Thus, the governmental patterns for this sort of control had already been settled when air traffic regulation became a matter of national concern.

THIS was the ample framework of constitutional law and practical government into which the Civil Aeronautics Act of 1938 was fitted. A distinctive task of nation-wide regulation confronted Congress. The response was the creation of the Civil Aeronautics Authority (now Administration). Subsequent reorganization directives by the president have defined the Civil Aeronautics Administration as an administrative agency in the Department of Commerce and have classified the functions of its legislative and judicial counterpart, the Civil Aeronautics Board, which reports through the Secretary ofCommerce but is responsible directly to the President and Congress.

The nature of air traffic is such that there appeared to be no satisfactory alternative to its regulation on a national basis. Airplanes pass over small states in minutes and over large ones in a few hours, and the pilots cannot see state lines from the air.

Whatever the traditional or current political mores of our people may be, extensive use of airplanes seems certain to encourage centralization of government. Much of the social significance of air transportation grows out of the fact that it makes the entire world smaller in terms of travel time. In such terms the world is now smaller than was the United States in Lincoln's day, and the United States is now smaller than was a state of average size in 1861.

Withal, the airplane merely accelerates a general trend. Efficient and inexpensive radios, telephones, automobiles, and trains already have produced for our own country much of the unity the airplane is destined to further both here and abroad. The result is that the entire United States has become an administrative unit which is more accessible to a central office than the outlying portions of many states were to their own state capitals only a generation ago.

SINCE both necessity and convenience make regulation of air transportation primarily a national affair, officials who have been charged with administration of it realize they must approach their tasks with fundamental understanding of their responsibilities. Since they have virtually exclusive jurisdiction, the formulation of general policies and all aspects of administration become matters of great importance. When all sections of the country must conform to a federal program, it must be substantially adaptable to each of the forty-eight widely varied states. The whole-hearted support of state and local officials, who most often understand state and local conditions, is almost indispensable.

If the program is such that these officials can participate, such participation can be made real and satisfying to them. So long as state and local officials have time, resources, and willingness, their participation in federal programs well might be limited only by necessary provisions for the protection of Federal funds, and by direct Federal administration in the relatively few cases where broad considerations of general policy are locally ignored. When Federal officials give state and local officers real authority under such conditions, democratic government can be improved by preserving the strengths of the systems of local control by which we have lived.

These have been the principles under which the Civil Aeronautics Administration has coöperated with state and local school systems in their programs of aviation education. There is no rea-

son to believe these principles will be violated in the future.

Consider, for instance, the plans to give high school students of preflight aeronautics the CAA examinations which will enable them to meet the "ground school" requirements for the Private Pilot Certificate. No high school need teach preflight aeronautics, so far as CAA is concerned. And if it does, no CAA examinations need be given in that school unless the local school authorities want them. Even then, no student need take the CAA examination unless he elects to do so. A centralized examination system for the certification of pilots seems to be a necessary part of the regulatory structure, but the Federal agency works on a voluntary basis, as it makes the advantages of its authority and central position available to the local high school and to the students in that school.

THE philosophy underlying the aviation education program is one long taught in the leading schools of education and elsewhere concerning the proper place of the Federal Government in education. Conditions which arise from the nature of the task itself make Federal participation in aviation education inevitable. That participation can be most beneficial to local schools when it comes by way of service and assistance, with a minimum of controls. This practice is based on the confidence that local administrators have capacity for good judgment. The history of education shows that they have justified such confidence. The result is increased educational efficiency and an example of democratic educational government at its best.

Indeed, the notable success of our educators in introducing preflight aeronautics courses into our high schools within the past few months indicates that our state and local leaders are in accord with the statement of President Roosevelt made to the National Aviation Forum in 1939:

> Civil Aviation is clearly recognized as the backlog of national defense in the Civil Aeronautics Act which set up the effective machinery for a comprehensive national policy with respect to the air....
>
> This new national policy set up by the Congress views American aviation as a special problem requiring special treatment. Aviation is the only form of transportation which operates in a medium which knows no frontiers but touches alike all countries of the earth. One fact which stands out is that hardly another civil activity of our people bears such a direct and intimate relation to the national security as does civil aviation. It supplies a reservoir of inestimable value to our military and naval forces in the form of men and machines, while at the same time it keeps an industry so geared that it can be instantly diverted to the production of fighting planes in the event of national emergency.

Government Seeks Snapshots of Foreign Lands

Photographs showing the terrain of foreign lands which possibly may become theaters of war are sought by the United States Government's Office of Strategic Services. Teachers who have taken photographs abroad are requested to go through their snapshots and pick out all foreign pictures which show as backgrounds landscapes, harbors, beaches, docks, manufacturing plants, oil storage facilities, railroad stations, yards, and tracks. Silhouette shots of islands, air views of cities and harbors, or pictures taken from heights are particularly valuable. The pictures themselves should not be sent at this time, but a description of existing photos should be addressed to the Office of Strategic Services, Station G, Box 46, New York City.

The Place of CPT in Aviation Education

By THERON S. TABER JR.

This symposium is concerned with preflight education in the high schools. Lest there be some confusion in regard to the relationship of this new program to the older Civilian Pilot Training program which secondary people have known in the junior colleges, this article by Mr. Taber is included as a part of the symposium. It makes the distinction very clear, at the same time rendering the additional service of bringing us up to date with the latest developments in the Civilian Pilot Training program, developments which make Civilian Pilot Training definitely a part of the armed forces' training program.

Mr. Taber is dean of men and coordinator of Civilian Pilot Training in the Bakersfield Junior College. At Bakersfield, also, he is chairman of the Engineering Department.

WITH the Civil Aeronautics Administration and the United States Office of Education taking the lead in the solution of the problem of preparing our younger generation for active, purposeful participation in this and in the coming air age, it may be of interest to examine the history of the Civil Aeronautics Administration's first step toward promoting interest in aviation on a college level.

It may be that by following the evolution of the Civil Aeronautics Administration's Civilian Pilot Training program we can predict to some extent what to anticipate for the "Air Conditioning Young America" program, which is now inaugurated or being inaugurated in nearly all of the secondary schools of this country. To the secondary school teachers and administrators a discussion of the Civilian Pilot Training program may be of aid in orienting in their minds these two aviation educational programs.

IN September, 1939, the Civil Aeronautics Administration (then known as the Civil Aeronautics Authority), under the leadership of Robert H. Hinckley, inaugurated the most extensive and complete civil pilot training program in powered planes the world has ever known. In brief, it was a plan by which the Civil Aeronautics Administration contracted simultaneously with the universities, colleges, and junior colleges to provide instruction in aviation ground courses and with commercial flying schools to provide instruction in flight courses. The combined flight and ground instruction was known as the "Civilian Pilot Training Program" and was entirely civil in nature, requiring no military or other obligation on the part of the trainees.

Trainees in this program were restricted to the 18- to 26-year-old bracket. Women were allowed to enroll in the program but could not exceed in number 10 per cent of the total quota.

This first course was designed to train for a private pilot's license. In most colleges the students who enrolled pursued the program as supplementary to their regular course of study. It consisted of thirty-five to forty-five hours of flight instruction in light planes and seventy-two hours of ground school instruction in navigation, meteorology, and civil air regulations. This flight

and ground instruction was spread out over much of the school year.

The result of the 1939 venture was to demonstrate that the nation's universities, colleges, junior colleges, and commercial flight training schools could train civilian pilots safely and efficiently. In the first ten thousand pilots trained, there was only one student fatality.

In the summer of 1940, with the events in Europe taking a serious turn, the Civil Aeronautics Administration made changes in the Civilian Pilot Training setup in order that this program could fit more efficiently into our defense preparations. First, the program was accelerated to turn out three classes per year rather than only one. Second, trainees were required to sign a military pledge agreeing to apply for flight training in the military service of the United States. Third, an advanced (secondary) course was inaugurated to train further those students who completed successfully the beginning or elementary course and who were recommended for further training by the ground and flight schools.

This secondary course consisted of 40 to 50 hours of flight instruction in certified air craft of 120 to 220 horsepower (Ryans, Stearmans, Wacos, etc.) and 108 hours of ground school instruction in power plants (engines, propellers, and accessories), instruments and parachutes, aerial navigation, and radio instruction.

At the same time there were added two more advanced flight and ground courses known as the Cross-Country course and the Flight Instructors course. These two courses were handled entirely by commercial flight schools and were designed to carry the recommended graduates of the Secondary course through the necessary flight and ground instruction to enable them to attain their commercial and flight instructors' ratings.

WITH the outbreak of the war on December 7, 1941, it became necessary to increase the military aspect of the Civilian Pilot Training Program and to shorten still further the training period. On July 1, 1942, the Civil Aeronautics Administration inaugurated what is known as the Full-time Civilian Pilot Training Program. These full-time courses were designed to give preflight and ground instruction to naval aviation cadets, to train both army and navy flight instructors, to give power flight and ground training to army glider pilots, to give flight and ground instruction to army liaison pilots, and to train pilots to enter airline training schools for copilot transport training.

The changes made in the part-time Elementary and Secondary courses in redesigning them on a full-time basis were as follows: (1) duration of the training period was shortened from one semester to eight weeks; and (2) the number of hours of Elementary ground instruction were increased from 72 to 240 hours and broadened to include the following ground school subjects: mathematics, physics, civil air regulations, navigation, general service and operation of air craft, radio code, military and physical training, air craft identification, military science and discipline, and meteorology. The Secondary ground school course was increased also from 108 to 240 hours and was broadened to include navigation, radio code, military and physical training, air craft identification, military science and discipline, meteorology, theory of flight and air craft, air craft engine operation.

FROM time to time changes have been made in the eligibility requirements for enrollment in the Civilian Pilot Training courses. At the present time these requirements are as follows:

To enroll in the Navy full-time Ele-

mentary Civilian Pilot Training Program, one is required to be enlisted in the Naval Air Corps Reserve as an aviation cadet (Navy V-5) and to request assignment to a civilian pilot training center through the senior member of the naval aviation cadet selection board in the naval district in which the prospective trainee was enlisted. In addition to the above-mentioned aviation cadets, the Navy will assign to civilian pilot training centers for Secondary, Cross-Country, and Flight Instructors courses a selected group of applicants who are unable to meet cadet requirements but who meet the requirements for A-V (P) classification. These applicants will be appointed as ensigns and assigned to active duty with pay during the training period.

To enroll in the Army full-time Civilian Pilot Training Program, an applicant must meet the following minimum requirements before the Army will enlist him in the Army Air Corps Enlisted Reserves for this specific purpose: First, be a United States citizen. Second, be between the ages of 18 and 36 inclusive (if between the ages of 18 and 26 inclusive, the applicant must have been rejected by the Army Cadet Selection Board). Third, pass the Civilian Pilot Training screening test. Fourth, pass the appropriate Civil Aeronautics Administration physical examination.

FROM the beginning of the Civilian Pilot Training program, it was realized that such an educational program restricted to the college level would fall considerably short of preparing all of our younger generation for intelligent and active participation in an air age. Because events in Europe were leading this country to war, however, it became necessary to begin preaviation training with those college youths who would be the immediate man power to expand our rapidly growing Army and Navy air forces. And so, with the Civilian Pilot Training Program well established, it was natural for the Civil Aeronautics Administration and the United States Office of Education to turn to the problem of "Air Conditioning Our Youth" from the kindergarten up.

This new program from its beginning has been designed to mobilize our entire educational system in an all-out educational program to increase vocational proficiency in some particular phase of aviation and to teach to the youth of America a comprehension of the significance of aviation.

To accomplish the first objective, it is expected the Civilian Pilot Training programs of our colleges will go hand in hand with the Air Conditioning program of our secondary and grade schools. With the inauguration of special aviation courses, and with the added emphasis placed on aviation problems in mathematics and science courses in our secondary schools, it is reasonable to expect that a considerable amount of material in the ground school instructional work of the Civilian Pilot Training Program may be replaced by more advanced and technical material and that in turn a better trained and more efficient youth will be turned over to our air forces for their specialized aviation training.

Since it is the immediate concern of the Civilian Pilot Training Program to train our youth who already are enlisted in the Army and Navy air forces, the very important problem of teaching the significance of aviation to our young people and the present and probable future effect of aviation on our social, economic, and political institutions will be one that is dependent almost entirely on the secondary and grade schools and their Air Conditioning programs.

Los Angeles Organizes a Preflight Program

By MAURICE G. BLAIR

Elsewhere in this symposium we read how individual schools, large and small, have organized to participate in the preflight program. In the present article we learn how a large city has effected its organization. And, incidentally, just as has been the case in most small localities, the preflight program in Los Angeles has had to start from scratch—Mr. Blair himself writes: "Know nothing about aviation—learning plenty."

Mr. Blair is director of the Secondary Curriculum Section of the Los Angeles City Schools. For twenty-five years he has been in the Los Angeles system, serving as teacher, vice-principal, principal, and supervisor. Although he himself professes to know nothing about aviation, he has the necessary background for understanding in this field, for he trained as a civil engineer and has had some military experience.

THE Los Angeles City Schools opened in September, 1942, with a determination to contribute in every way to the war program. Elementary, junior and senior high schools, junior college, and other special schools geared their school program to the war effort and centered their instruction in every class in keeping with wartime objectives in the following eight areas: (1) Health and Physical Fitness, (2) Military and Industrial Training, (3) Conservation, (4) Civilian Defense and Community Service, (5) Morale and Unity, (6) World Affairs, (7) Air-mindedness, and (8) Consumer Guidance.

Particular emphasis was given in all subjects to the development of new concepts and attitudes in tune with the speed and tempo of the air age. History, vocabulary, global-geography served as a basic introduction to the science, mathematics, and shop courses geared to the air program.

SCIENCE of Aeronautics, Meteorology, Navigation, and Aerodynamics were offered to students in more than twenty-one high schools. A four-year major in aeronautics was offered, beginning in the ninth year of the junior high school. More than fourteen schools now offer complete majors in this field. The program of subjects available to selected students includes the following:

Plan I. *Maintenance—Service—Production.* This course provides students with an orientation in the broad field of aircraft and aeronautics and gives prevocational training in aircraft production. It provides also a practical and balanced training in primary vocational skills and understandings as related to aeronautics.

NINTH GRADE

Mathematics I and II.
General Science (aeronautics emphasis).
Model Plane Making in Wood Shop and Electric Shop (unless taken in A-8) or Drafting.
English and social studies (emphasis on aviation in its social, economic, and commercial aspects; world geography with an aeronautics point of view, understanding distances, longitude, latitude, et cetera).
Physical Education and Health.

TENTH GRADE

Applied Mathematics (Shop Problems) or Algebra I and Algebra II.

Life Science and Health.
Drafting, Blue Print Reading, Machine Shop or General Metal, and Internal Combustion Engines and Photography (aeronautics emphasis).
English—Orientation English (aeronautics emphasis).
Social studies—Aeronautical Geography.
Physical Education or ROTC.

ELEVENTH GRADE

Military and Industrial Mathematics or Geometry.
Physical science (Applied Physics and Applied Chemistry).
Aircraft Construction and Maintenance.
English (aeronautics emphasis).
Social studies—United States History (American Life and Institutions—United States aind World Geography) and American Government and Citizenship (including study of Civil Air Regulations).
Physical Education and Health or ROTC.

TWELFTH GRADE

Geometry II (if Geometry I was taken in A-11) and Military and Industrial Mathematics.
Science of Aeronautics.
Intensive vocational training.
English (aeronautics emphasis).
Social studies—Senior Problems and Health.
Physical Education and Health or ROTC.

Plan II. *Engineers—Aviation Cadets.* This course of study is designed for both college and noncollege preparatory students. It is planned with a view to preparing for army, navy, and civil aeronautical training. It provides a practical and balanced training in primary skills and understandings as related to aeronautics.

NINTH GRADE

Algebra I or Mathematics I and Algebra II or Mathematics II.
Electric Shop or Model Plane Making and Identification of Planes and General Metal.
English and social studies (emphasis on aviation in its social, economic, and commercial aspects and World Geography with an aeronautics point of view: distances, latitude, et cetera).
Foreign language (beginning ninth year).
Health and Physical Education.

TENTH GRADE

Geometry I or Algebra I and Geometry II or Algebra II.
Life Science and Health.
Drafting and Blue Print Reading and Machine Shop or Internal Combustion Engines.
English—Orientation English (aeronautics emphasis, nomenclature).
Social studies—Aeronautical Geography.
Foreign language (beginning tenth year).
Physical Education or ROTC.

ELEVENTH GRADE

Algebra III or Geometry I and Algebra IV or Geometry II.
Physics.
Aircraft Drafting.
English (aeronautics emphasis, nomenclature).
Social studies—United States History (United States and World Geography) and United States Government and Citizenship (including study of Civil Air Regulations).
Foreign language or elective (Radio Communication, Photography, et cetera).
Physical Education and Health or ROTC.

TWELFTH GRADE

Solid Geometry or Combined Algebra and Trigonometry, and Trigonometry or Military and Industrial Mathematics.
Science of Aeronautics—Chemistry for second period engineers, and Aircraft Construction and Maintenance for second period flying cadets.
Aircraft Construction and Maintenance.
English (aeronautics emphasis).
Senior Problems and Health (world geography, weather, et cetera).
Physical Education (tumbling and gymnastics) or ROTC.

STUDENTS admitted to participation in the aeronautics program are selected on a basis of inclination or interest, aptitude, achievement, and mechanical ability. Interest inventories and tests of emotional and mental stability, aircraft information, and aircraft arithmetic offer assistance in the matter of selection. Physical examinations and, in many cases, special eye examinations are given boys enrolling in Plan No. 2.

Materials of instruction used in the aeronautics program include textbooks, supplemental reference, instructional bulletins, maps (weather and global), visual aids, and government pamphlets. These materials cover not only the

mathematics, sciences, and shops but deal with concepts of the air age.

Shop equipment has presented the most difficult problem because of government regulations. A few radial type airplane motors were obtained through Board purchase and through individual school initiative. Instruments and parts were obtained where and when possible. It is remarkable what you can do when you really go after it.

Auto shops were converted into aircraft maintenance and service classes. Sheet metal, general metal, wood shop, drafting, and other vocational classes were given an air emphasis, and training was geared to related work wherever possible.

TEACHER conversion training classes had been held during the summer school for instructors interested in the Science of Aeronautics; in Meteorology, Navigation, and Aerodynamics; and in Military and Vocational Mathematics. Beginning in September, classes were offered also to instructors who were unable to enroll during the summer.

Douglas, Lockheed, and North American Aircraft Plants employed many of our vocational and industrial arts instructors during the summer vacation period and permitted them to work in any of the departments or field which would be of value to them in their class work.

COORDINATING the total program for the aeronautics major requires the working together of the various departments, instructors, administrators, and supervisors. A battery of curriculum supervisors visited the schools on call and gave an over-all view of the program. The work of this committee was most valuable and an important factor in interpreting and clarifying the many questions and problems.

The results of our whole aeronautics program to date have been most gratifying. Starting from scratch, with materials to be purchased, textbooks to be adopted, teachers to be trained and *converted,* conflicts in programs to be adjusted, and personnel to be *sold,* we feel that our progress has been remarkable and our contributions to youth and to the war program most worth-while.

New Books in the Visual and Audio Fields

Numerous new publications are appearing in the field of audio and visual education. Among those which have been sent for review to the CALIFORNIA JOURNAL OF SECONDARY EDUCATION are the following:

Broadcasting to the Classroom by Universities and Colleges, by Carroll Atkinson. Meador Publishing Company, Boston, 1942. Price, $1.50; 128 pages.

1000 and One, the Blue Book of Non-Theatrical Films, 1942-43. The Educational Screen, Chicago. Price, 75 cents; 132 pages.

Public School Broadcasting to the Classroom, by Carroll Atkinson. Meador Publishing Company, Boston, 1942. Price, $1.50; 144 pages.

Radio in State and Territorial Educational Departments, by Carroll Atkinson. Meador Publishing Company, Boston, 1942. Price, $1.50; 136 pages.

Radio Programs Intended for Classroom Use, by Carroll Atkinson. Meador Publishing Company, 1942. Price, $1.50; 128 pages.

Recordings for School Use, 1942, by J. Robert Miles and R. R. Lowdermilk. "Radio in Education Series," World Book Company, 1942. Price, $1.24; 234 pages.

Air-conditioning a Small High School

By L. W. RICHARDS

Because the problems a school has to face in readjusting its curriculum to make room for preflight training obviously are extremely severe in the smaller high schools, this symposium includes two articles from schools enrolling but a few more than 100 students each. This particular article comes from the Biggs Union High School and illustrates how even the smallest school can air-condition its program. It is interesting to note that Biggs has done most of this air-conditioning by a change in emphasis in existing courses rather than by the introduction of new courses.

Mr. Richards is principal of the Biggs Union High School.

WHILE attending the American Association of School Administrators' convention in San Francisco during the month of February, 1942, the principal of the Biggs Union High School was greatly impressed by an address given before the convention by Superintendent A. J. Stoddard of the Philadelphia Public School System. Superintendent Stoddard made a stirring appeal to administrators present to support the air-conditioning movement in the schools of the United States.

Bringing this message in regard to the air-conditioning plan to his teachers, the principal was received with enthusiasm. Each teacher immediately began plans for using the airplane to motivate as many units as possible in each of his subjects fields.

The curriculum committee after several months' study made the following recommendations for the school year 1942-43:

A. Organize a specific course in preflight aeronautics covering aerodynamics, meteorology, aviation, communications, and airplane engines—prerequisites of the course to be algebra, geometry, trigonometry, chemistry, and physics.

B. In each subject field include as much nonmathematical aeronautics as possible, in so far as it can be correlated with the general content of each subject.

AS a result of these recommendations the following revisions in the curriculum were made for the school year 1942-43.

1. One of the three farm mechanics classes was converted into a general shop class, where greater emphasis is placed on mastery of the skills needed in welding, metal work, and model airplane construction. This class now is constructing a wind tunnel. A movement has started to organize a glider club for the 1943-44 school year.

2. The mechanical drawing classes have been converted into aeronautical drafting classes. The enrollment has increased greatly, and student interest is such that many more plates are being finished per quarter by each student.

3. Most of the usual literature of all of the English classes has been replaced by literature on aviation. In these English classes, also, is presented for mastery the new aeronautical vocabulary. English units on safety are emphasizing air traffic rules, safe flying procedure, and so on.

Two new literature textbooks, *Flying High*[1] and *Wings for You*,[2] are being used. Much use is being made of the complete set of the *National Geographic Magazine*, 1917 to 1942. This magazine published more articles on aeronautics prior to Pearl Harbor than any other general magazine not devoted exclusively to aviation. The classroom weekly magazine, *Current Aviation*, also is being used.

4. In the social studies classes, even more emphasis is being placed on current events, particularly in reference to the exploits of military and naval aviation. The weekly *World News of the Week* is used in these classes; this excellent tool is including more and more aeronautical material.

5. The Spanish classes are introducing, in addition to the usual vocabulary, the Spanish aeronautical vocabulary. Also in these Spanish classes the story in Spanish of the development of Inter-American aviation and other relations is supplementing much of the usual Spanish literature.

6. In mathematics increased enrollments in algebra are of particular interest. This trend should follow through later in increased enrollments in the other advanced mathematics classes. The whole study of mathematics is being motivated by the utilization of aeronautical problems. This is proving particularly helpful for the slow students, the approach being gradual from the arithmetical to the algebraic.

For the second semester a special class in aeronautical mathematics is being planned. This class will be opened to students who have not enrolled in algebra but who desire to qualify for the preflight aeronautics course in 1943-44.

7. In the Commercial Department two classes in general business are placing greater emphasis on the units devoted to transportation and communications, particularly as they pertain to aeronautics. Again, the aeronautical vocabulary is being added in the typing and stenography classes.

8. For nine years a considerable portion of the freshman social studies content has been devoted to geography. This year greater emphasis is being placed on polar projection and the study of the world as a globe. Added is the text, *Human Geography in the Air Age*.[3]

9. In the art classes more emphasis is being placed on perspective, interpretation of air photographs, the use of color and form in aeronautical design, and so on.

10. In the homemaking classes the skills and tools of the air hostess are being discussed, and the students are mastering many of them.

11. In the physical education program more emphasis is being put on 100 per cent participation by our students and on physical fitness. This program is being motivated by giving standard tests covering visual acuity, ocular balance, hearing, balance, muscular coördination, et cetera, as they are given to air cadets by the army and navy flying schools. This program also is being motivated by outlining to the students similar physical fitness programs in use at the various government preflight schools.

12. For some years an organized audio-visual program has been in use. This year, in place of the general materials used previously, the following are being emphasized:

(*a*) Frequent use is being made of sound films, secured from the various government agencies, on aviation. Many are being made available daily.

[1] R. N. Cohen, The Macmillan Company, 1942.

[2] F. A. Cross, The Macmillan Company, 1942.

[3] G. T. Renner, The Macmillan Company, 1942.

(*b*) An aeronautical training slide film kit containing over 1,500 pictures and drawings is being used in the pre-flight aeronautics course.

(*c*) A large aeronautics bulletin board, to which are pinned daily clippings from magazines, newspapers, and government bulletins, has been constructed.

(*d*) Drawings and photographs of United Nations and enemy planes are mounted to form a gallery to enable the students to identify them.

(*e*) Two new large-scale polar projection maps of the world mounted on rollers are now in use.

(*f*) Two new world globes are being utilized to help students visualize such aeronautical terms as "great circles," et cetera.

(*g*) A wealth of visual material is being accumulated and filed, including drawings, graphs, weather maps, airline maps, cloud-form photographs, air-instrument charts, et cetera—all related to aeronautics. These are being secured largely from fifty different sources outlined in the *Teachers' Manual for Science of Pre-Flight Aeronautics for High Schools*[4] worked out by the Aviation Education Research groups of Teachers College, Columbia University.

WE found that some 8 per cent of our students were qualified in the algebra and geometry required for enrollment in the course we set up and entitled Aeronautical Science. (This should be increased to 20 per cent for 1943-44.) We did allow several students to enroll in the Aeronautical Science group with algebra completed and geometry being undertaken. The new course is conducted two periods daily, a total of ten periods per week. Three textbooks are used—a standard physics text, a standard trigonometry text, and the new *Science of Pre-Flight Aeronautics for High Schools*[5] text.

College credit will be given for both physics and trigonometry. As each unit of physics is studied, the problems and applications are related to aeronautics. There is not a single unit usually covered by high school physics classes that cannot be applied to the airplane or airship. The trigonometry is covered not by utilizing the usual surveying problems, but by substituting problems in aviation and the resolution of forces involved in the study of aerodynamics.

The teachers and principal of the Biggs Union High School are gradually catching up with the students, and soon the whole school will be air-conditioned.

[4] The Macmillan Company, 1942.

[5] The Macmillan Company, 1942.

New Information on Military Occupations

The *Occupational Index*, established in 1936 under a grant from the Carnegie Corporation, has just announced that in the future it will review, annotate, index, and evaluate all new publications on military occupations. It will cover all books and pamphlets which describe the attractions and the disadvantages, the opportunities and requirements of all branches of the Army, Navy, Marines, Coast Guard, Air Corps, Waacs, Waves, and Wows, and the Service Projects for Conscientious Objectors.

Professor Robert Hoppock, in announcing the new service, said that vocational guidance for boys is becoming almost exclusively guidance for military service and that it promises to remain so for the duration. He predicted that school and college counselors would soon find their college catalogs and books on civilian occupations being pushed off the shelves by books and pamphlets on the new military careers. The new service, he said, is designed to help schools and libraries to find the best sources of information on any branches of the service in which their students may be interested.

The Small School's Part in Preflight Education

By E. O. TALBOTT

Acknowledging that the small high school will have difficulties in squeezing additional courses into its already crowded curriculum and in assigning new classes to present personnel, the author of this article contends, nevertheless, that the small school must accept the challenge that aviation has given it—if necessary, it must eliminate some of the traditional courses to make way for preflight courses.

Mr. Talbott, who makes this contribution, has been principal of the Los Molinos High School for seventeen years. Before going there he taught in the Alhambra High School, Martinez, for two years and for nine years was teacher and vice-principal in the Glenn County High School, Willows. That his school might make its contribution to the war effort and prepare boys and girls for the present and coming air age, he himself attended a course in preflight aeronautics this last summer.

THERE are people who feel that many subjects, such as trade and industries and preflight training, have no place in the program of the small high school. This opinion is shared by some administrators of small high schools, as well as by those of some of the larger high schools. A crowded program and heavy teacher loads are common reasons given for this contention. Other factors that enter the picture are lack of competent personnel to present the subject and inadequacy of equipment. In spite of these problems, which do exist, the small school has a definite part to play in preparing America for her inevitable future.

The request, as sent out by the United States Office of Education, to "air-condition America" is a challenge to our schools and to our educational system. It is a challenge that must be met if America and American institutions are to perpetuate themselves and democracy. It is a challenge that will test the flexibility of the democratic system and prove its willingness and ability to deviate from set or staid methods of procedure temporarily to meet a crisis and permanently to enter a new world.

It is not just a challenge to meet the present demands; the air-conditioning of America is necessary to carry us into the air age after the war, a world into which we are destined to move. Recently, the officer in charge of the ground school work at the Chico Army Flying School made the remark, "In the future, the uncommon boy or girl will be the one who cannot fly a plane." This is the view of many who are in the field as well as of others who see into the future. This being the case, it is up to the schools to do what they can to "air-condition" their curricula.

As one of the small high schools, Los Molinos accepts this challenge and feels that the small school, in general, can do a great deal toward meeting the present needs and preparing for the future air age.

CERTAIN it is that no standard course in aeronautics will be introduced at the present. The courses will vary from meager one-semester and one-year courses in many schools to

four-year majors in some of the larger schools. But no matter how small the effort, it will be a move in the right direction. It is a matter not only of making available the preflight technical courses, but of getting America to thinking in terms of the air age. Time and experience will iron out the difficulties and standardize the courses to some extent.

A major in a small school, however, can be worked out with mathematics, physics, mechanical drawing and blueprint reading, and shop (either woodwork or auto mechanics, or both) as subjects in the major.

We have such a course in the Los Molinos High School. It consists of thirty semester periods of mathematics, thirty semester periods of English, ten semester periods of United States history and civics, twenty semester periods of mechanical drawing and blueprint reading, ten semester periods of woodwork and building of plane models, ten semester periods of preflight aeronautics, ten semester periods of physics, and twenty semester periods of trade auto mechanics. This gives an excellent technical and trade background.

In addition to the major, the entire school curriculum is being air-conditioned, for we are placing all the emphasis possible on aviation and making all the tie-ups of its several phases that can be made with the other subjects. An aviation anthology is being used in the English classes. Emphasis is placed on map work (especially with global maps) in the social studies, where the closeness of nations and their interdependence are taught—for the airplane has annihilated space and physical barriers between nations and continents; physically, the world is one. Art has its part to play; and biology, as well as the other sciences, is being tied to the aviation program.

IN the matter of personnel, each school should bend every effort to have those teachers on the staff already best prepared in the field of mathematics and physics take some special instruction in preflight subject matter—either in summer school, in extension courses, by correspondence course, or by any other method available.

Such a procedure will open up to the teachers a wealth of materials, literature, and information that they could not possibly get in any other way. This is very worth-while and should be done even at the expense of some other subjects in the curriculum. At the present time some foreign language or other present college entrance requirement subject can be replaced profitably by a course in preflight subject matter—for we will have but few students entering college in the next year or two.

The subject of equipment is even easier of solution. The physics laboratory has many pieces of equipment that can be used in a preflight course. These, with some home-made apparatus and a few articles bought on the market, will be adequate for a beginning. The course need not be a full laboratory course if the school feels unable to give it as such at the present; laboratory work can be worked into such a course gradually.

We must not let the matter of teaching load and the question of where preflight courses are to fit in the curriculum keep us from proceeding. If necessary, we shall have to eliminate some subjects, or we may have to ask certain teachers to accept an added load for the present. This is a crisis that must be met. The men in the army, the navy, and the air corps are putting in many long and burdensome hours, as are many on the home front. This school and the teachers, too, can share the burden by doing a little double duty.

Fitting Preflight Courses into The Curriculum

By STANFORD HANNAH

THIS war will be won in the air by boys who now are in the high schools of America!

Secondary school administrators must realize the very probable accuracy of that statement. They must recognize also the importance and the immediacy of the challenge it puts before the high schools of our nation.

Those in command of our aviation forces have emphasized repeatedly that the 18-to-20-year-olds are the best pilots for the fighter or pursuit type planes. The almost fantastic figures used to indicate our future air power must be interpreted in terms of high school training of the future man power to fly, to man, and to service the planes.

There seem to be two parts to the job before us. In the first place, we face an emergency situation which demands large numbers of youths trained as soon as possible to do a very important task. We must take these boys and young men as they are and start from there. We must do what we can during the brief months they will remain with us to give them training that will help them to fly, to fight, or to service planes.

A second part of the job is to provide preflight training for boys who will not enter military service for two, three, or four years. This indicates a series of solutions. We must provide training for boys graduating in June of this year; others will graduate at the termination of successive semesters or school years. Each group should have its problem studied with consideration given to the time element.

The administrative problem of superimposing an elaborate preflight program on an already crowded high school program seems almost staggering. Accordingly, Mr. Hannah was asked to answer certain questions: At what grade level does preflight training fit best into the curriculum? What about credit for these courses? Are there to be any prerequisites? Will there be any grouping according to ability or interest? Can college preparatory students participate in the program? In other words, he was asked to look on the problem from the point of view of an administrator and to discuss in practical terms how preflight training can be incorporated into the curriculum.

Mr. Hannah's sixteen or seventeen years as a school administrator fit him to write this article. He is district superintendent of the Taft Union High School and Junior College.

CERTAIN high schools now are offering a course or courses in preflight aeronautics. Some limit the enrollment to senior boys, and others are less restrictive. Personally we believe the course will be most valuable and effective when given to homogeneous groups. Boys who have considerable ability in mathematics can master a more technical course than those with less ability. In larger schools it is possible to have two or more sections, and this situation helps to make grouping possible.

It is not the function of this contribution to the symposium to describe a particular preflight course. We would

suggest, however, careful planning of the course to the end that the students who later will enter training in the military forces or in the Civilian Pilot Training Program for those forces will get the maximum benefits.

The ground courses in the Civilian Pilot Training Program, now being given by several California junior colleges, necessarily will be more "practical" and perhaps more advanced than the high school preflight courses. At present they have the handicap of being "crowded for time" and so should benefit greatly in the future when they begin to receive students who have the advantages of a preflight course in high school. Instructors should familiarize themselves thoroughly with these and other military primary ground courses in aeronautics.

LOOKING ahead to 1943-44 and subsequent years, the high school administrators must use to the best possible advantage the greater amount of time available for preflight training. From the ninth grade up, and indeed even earlier, courses in mathematics and science will and should increase the attention given to aviation topics and problems.

In this particular section of the high school curriculum, provision must be made for the wide variation in the abilities of students. The aviation industry and the aviation branches of the armed forces have need for men of greatly varied training and capacity for training. Some types of flying require a very complete mastery of the intricacies of navigation, while in other types of planes the pilot flies "by the seat of his pants."

Recognition must be given also to the fact that for each pilot there are many engaged in other phases of aviation and that probably most of those enrolled in the preflight courses in high school will not become pilots during the war. On the other hand, if we agree that the "age of the air" is here, then probably most of our students, boys and girls, eventually will pilot their own planes. The introduction of preflight aeronautics, therefore, must be considered as a permanent development in the activities of the secondary schools.

Thorough training in mathematics and physics is urged as preliminary work to aeronautics. Some work in mechanical drawing and mechanics will be of certain value.

The following four-year curriculum is to be considered as a suggestion only. Aside from the essential mathematics and physics, we will agree for the most part with the one who said, "Tell me who was your teacher, not what did you study."

Ninth Grade	*Tenth Grade*
English	English
Physical Education	Physical Education
Algebra I	Plane Geometry
General Science	Mechanical Drawing
Elementary Shop	Geography
Eleventh Grade	*Twelfth Grade*
English	English
Physical Education	Physical Education
Algebra II	Solid Geometry (½) and Trigonometry (½)
U. S. History and Government	Physics
Aeronautics I	Aeronautics II

THE above program obviously is arranged for the superior students. In schools with a seven-period day there is sufficient time left available for the student to meet certain university entrance requirements or for him to comply with his particular interests.

For the student who is unable to profit by the usual study of advanced algebra, solid geometry, trigonometry, and physics, we suggest that courses in "Preflight Mathematics" and "Preflight Science" be substituted in the eleventh and twelfth grades. These courses necessarily should be planned

and taught with special consideration given to the capacities of the students.

Provision must be made, too, for the "mechanically minded" boys who have taken the maximum number of shop courses. These boys, too, may be pilots or gunners who must fly in an emergency. Whatever we can do to prepare them for such an emergency is important enough to warrant careful consideration of each student's program.

GUIDANCE as a function of the high school is important in preflight training. Too many youth have planned and worked for years with the idea of becoming pilots, only to find that they are not equipped physically for this exacting rôle. All too frequently the factors which eliminated them from the possibility of becoming pilots could have been discovered and corrected at earlier times.

Careful physical examinations with definite follow-up activities should discover most of the causes for eventual rejection, and in many cases this early discovery makes possible the correction of the conditions. If a physical examination given in the early high school years indicates a condition which precludes the individual's ever becoming a pilot, the adjustment to some other occupation, perhaps in the field of aviation, can be made more easily.

In other aspects of the guidance program, we must be constantly aware of the national emergency need for fliers. The Army and Navy estimates of future needs are so great as to indicate that we must "sell" boys the idea of doing their patriotic duty. Fortunately, American boys are easily "sold" on this idea and as easily "sold" on the idea of flying.

In fairness to our students and in recognition of our responsibility to them, our guidance should look ahead to eventual peacetime pursuits. We believe that first of all the national war need must be considered, but we believe also we must use all the thought and ingenuity possible to coördinate training to meet the national need and the individual's future welfare.

THE selection of the teaching personnel is especially difficult at this time. Because of the nature of aviation, teachers must have a good knowledge of mathematics and physics. If they have this background, are interested in aviation, and have the "teaching spirit," they can acquire the necessary specific knowledge of aeronautics by their own home study programs and by the teacher training courses being offered in the summer sessions of many universities and colleges.

School administrators are being flooded with a vast amount of materials purporting to teach aeronautics. Most of these will bear close scrutiny, and we can only suggest that schools initiating the program correspond with other schools that have made some progress even if by the trial-and-error method.

Accuracy of teaching and of materials is to be emphasized. An erroneous statement based on half-knowledge can destroy confidence in the instructor, the reference book, or other source of error.

THE high schools of America indeed have had a challenging and a difficult job thrust upon them. There will be factors in the program we do not like. The time element is too important. The students are too young. Our teachers are being drafted, volunteering, or entering more lucrative fields. But the job must be done. American school administrators will find a way to do it.

Providing Equipment for the Preflight Course

By GEORGE HOWDEN

Two points in Mr. Howden's description of how a school has developed a well-organized preaeronautics program almost over night are particularly deserving of mention. The first is his recognition of preflight instruction as something bigger than the immediate training of men for service in the armed forces. The second is the attention he gives to the use of equipment already on hand or easily providable at little expense. Many of the suggestions on equipment he includes in the latter portion of this article will be of practical value to other schools organizing similar courses.

Mr. Howden is principal of the Selma Union High School. His earlier teaching experience was at Surprise Valley Joint Union High School, Cedarville, and at Modoc Union High School, Alturas.

FACED with the necessity and desirability of doing something about the teaching of preflight aeronautics, the administration and faculty of the Selma Union High School set about during the years 1941-42 and 1942-43 to study the problems involved. Time was too short to formulate a definite philosophy, but there was a general agreement that the objectives to be kept in the fore should be long-term as well as immediate. In other words, it was recognized that there should be preparation for a civilization that would take to the air after the war as well as instruction in those phases of preflight aeronautics that would increase the value of a limited number of boys to the American air forces in the conduct of the war. The long-term objectives presumed that students would need to revise, supplement, and increase their experiences and understandings in many fields of knowledge related to the use of the air.

First, it was recognized that aviation depends on accurate measurement. Consequently, problems are being introduced into our regular classes in arithmetic, algebra, plane geometry, and trigonometry that have a bearing on aeronautics. They can be substituted for many of those in the traditional textbooks that never have had any connection with real life. This is expected to be a slow process since most textbooks have been written with a different purpose. If it is intended to teach mathematical principles, the avenue of problems in aeronautics is as good as any.

Second, we agreed that it is necessary to change some of the emphasis in the teaching of geography, particularly as it concerns air routes, the shifts in trade because of the use of air transports, and the accessibility of heretofore not too well known parts of the earth. Also, there is the need of expanded interest and understanding in the field of cartography as far as it is related to aviation. Some of the less known projections, especially the single and double cone, must be studied.

Third, it was generally understood that the use of the air will upset conceptions and practices in world economy. Once again an attack is needed on the economy of isolationism. Other aspects of economics in its relation to

aviation are to be presented in our classes.

Fourth, aviation units in science, particularly in physics, are being introduced. They parallel those in the more comprehensive course in aeronautics to be described in a later paragraph.

Fifth, it was recognized that aviation will require a greater measure of understanding among races and nations. Accordingly, use is to be made of the Pan-American Student Forum to increase the knowledge, understanding, and appreciation of our Latin American neighbors—the conception of American history, taught by Dr. Herbert E. Bolton of the University of California, is one of the chief guides long used in presenting the history aspect of this problem. An effort is being made to increase the enrollment in World History.

Sixth, teachers in other subject fields are encouraged to discover units in aeronautics that can be presented, even if it is necessary for them to displace others of less value.

Very little could be done in the year 1941-42 in the direction of organizing separate courses in aeronautics because of existing student programs. Furthermore, time was needed for study and planning to insure that efforts would not be wasted and that the faculty would have additional preparation. Nevertheless, projects such as the construction of model airplanes were carried on; but the establishment of the bulk of the program had to wait until the beginning of the current year. Even then, there was a hesitation as to whether preflight aeronautics should be taught as units of already existing courses or as separate courses. It was not until the first semester of 1942-43 was under way that it was decided to introduce separate courses in aeronautics and airplane mechanics. A revision of the daily and student schedules was accomplished with a minimum of inconvenience.

THE course in aeronautics, given for two semesters, includes aerodynamics, meteorology, navigation, communication, and some interpretation of aerial photographs. The course in airplane mechanics includes airplane construction, operation, and maintenance.

There were some obvious obstacles to overcome or avoid. First, there was that of faculty preparation. None of the teachers had had specific training in the subjects they were to teach, but the general training of each in mathematics, mechanical drawing, science, and mechanical arts was adequate. The woodwork instructor, though not teaching a course in preflight aeronautics, was able to direct the construction of model airplanes from blueprints. The instructor in science is supplementing his excellent training in both mathematics and science by a course in meteorology and navigation given by the instructional staff of the Lemoore Air Base. The mathematics instructor, a graduate engineer and a member of the Army Air Corps during World War I, is taking the same course. The metal-shop teacher has been interested in airplanes and airplane construction for about fifteen years.

Second, there was the preparation of students. It was originally intended to limit the course in aeronautics to students with at least two years of mathematics and currently enrolled in physics, but a few interested and capable students without this background were admitted. The airplane mechanics course was limited to those who were seniors with two and one-half years of metal-shop courses, including auto mechanics. This training presumes an understanding of the operation of lathes, milling machine, et cetera. Perhaps the capabilities and preparation of some who were enrolled in both courses were overestimated. The quality of the students

and their preparation determined the topics, projects, and sequences.

Third, there was the question of equipment and materials. Priorities, shortages, and budget limitations precluded the use of certain materials. Consequently, it was necessary to use and adapt equipment already on hand or easily procurable at very little expense. How we managed is described in the following paragraphs.

IN the course in aeronautics the unit on aerodynamics is to follow the more simple treatment of meteorology and aeronautics. The more complicated topics, such as air masses, warm and cold fronts, weather sequence reports, pibals, et cetera, are reserved for later study.

For the teaching of meteorology, appropriate physics apparatus, recently purchased, is used. It includes barometers, thermometers, dew point apparatus, the anemometer, et cetera. With other equipment it is possible to demonstrate the movements of air due to convection and pressure differences. Apparatus has been devised to predict flying conditions determined by fog and ice. A globe for teaching chart reading, map construction, and dead reckoning is indispensable. For this purpose, one 14 inches in diameter, painted black, is used. The same chart is used as a blackboard for showing meridians, parallels of latitude, and great circle navigation and for explaining map projections.

In the aerodynamics unit factors affecting airplane lift will be demonstrated with ordinary beam balance, the electric fan, and model airplane. It is proposed that we build an air tunnel for use with the above apparatus. Apparatus from the physics laboratory is used to demonstrate Bernoulli's Principle and the Venturi effect. Any physics text has at least three experiments to show the effect of increased velocity on fluid pressure and hence the resultant lateral thrust or vertical lift. For example, blowing air over a curved piece of paper illustrates in a strikingly simple manner how an aircraft wing is lifted by an upward thrust due to a difference in pressure above and below the paper.

Although a text has been adopted, a large number of other books and pamphlet references are available in the Science Department library. To stimulate interest, a copy of one periodical is given to each student.

The course in airplane mechanics is given to prepare students for ground work. In this course each student is required to build a rubber model plane of not less than 24-inch wing spread, to be adjusted and tested for load lift in a wind tunnel. The materials for the model are from unassembled airplane kits costing about fifty cents each. All of this material is in the rough, and students must cut it out and assemble it. The tunnel is to be built from a 50-gallon barrel, and the power for the wind is generated from a shop-made fan and 1 h.p. motor. These materials were on hand and, therefore, did not occasion additional expense.

As a class project, in the absence of a regular airplane motor, such a motor is in the process of construction. It is a five-cylinder radial type with the crank case made of the aluminum from a 1919 model Franklin motor. The students made all the necessary patterns and castings in the shop and foundry. The machine work was done on the lathes, milling machine, planer, shaper, and other machines available in the metal-shop.

The motor's crank shaft, a two-piece job, is made from a truck axle, offset forged with two Timkin bearings on the main shaft taken from the front wheels of a model-A Ford automobile. The master connecting rod is bronze-

bushed, 1½ inches in diameter, made from scrap bronze and machined to size. The four other connecting rods are pinned and bronze-bushed at crank-pin end. The wrist pins were made from the piston pins of a Ford V-8 engine. The cylinders were taken from the above Franklin engine, honed, and pistons expanded to fit. The valve gears are made from half-inch plate mild steel. Five gears are to operate two cams each for the five cylinders. These gears are 3 1/16 inches in diameter, mounted in a circle around the crank shaft and driven by a set of two master gears connected to the center gear of the five. The oiling is by pump to main bearings and master rod. The cylinders are connected by a steel pipe running to the center ring connected to the carburetor. An automobile carburetor is to be used. It is expected that a five-point distributor is to be built for the ignition.

Plans for the fuselage, wings, and other parts of the plane are being made. Materials easily procurable and inexpensive will be used. Will the plane operate? It may not, but the experience and understanding gained will compensate for the time spent in construction.

THIS article has been written when these courses are in the experimental stage. Many mistakes will be made, from which benefit can be derived. It is felt, however, that the two main objectives can be realized. It is by no means intended that out of these courses will come trained pilots or mechanics. It can be said that much has been accomplished if the vocabulary and theory of preflight aeronautics have been learned. It is the duty of the schools to cut down the time required for actual participation in the air forces by giving these courses within the limits of faculty training and materials and equipment.

Resource Units in the Social Studies

A series of resource units, each containing an analysis of a timely social problem by an eminent social scientist and numerous teaching aids by a master teacher, is being published jointly by the National Council for the Social Studies and the National Association of Secondary School Principals, with the assistance of the General Education Board. The series is introduced by a 30-page pamphlet (price, 10 cents), entitled *Using a Resource Unit,* by I. James Quillen.

The first five units in the series, all priced at 30 cents and dated 1942, are as follows:

How Our Government Raises and Spends Money (Unit No. 1), by Mabel Newcomer and Edward A. Krug; 80 pages.

American Youth Faces the Future (Unit No. 2), by Floyd W. Reeves, Howard M. Bell, and Douglas Ward; 72 pages.

Man and His Machines (Unit No. 3), by William Fielding Ogburn and Robert B. Weaver; 56 pages.

Recreation and Morale (Unit No. 4), by Jesse F. Steiner and Chester D. Babcock; 72 pages.

Race and Cultural Relations (Unit No. 5), by Ruth Benedict and Mildred Ellis; 60 pages.

Teaching Aeronautics in the High School

By CORNELIUS H. SIEMENS

What are the aims of a high school course in aeronautics? What students do and should take the course in aeronautics? What are source materials for the course? What are the activities and content of a course in aeronautics? To what extent should all departments of the school participate in the aeronautics program? These are the questions answered in Dr. Siemens' article.

The author is assistant professor of secondary education at the University of California, Berkeley. He is the author of the new "Aeronautics Workbook" of the "Air-Age Series" and last summer directed a summer workshop in preflight aeronautics at the University. He spends a great amount of time consulting with aeronautics teachers and Civilian Pilot Training instructors and coördinators for the CAA.

THE story of how the teaching of aeronautics has been introduced and has developed within the high schools of the United States is without parallel in the saga of the American secondary school. Educational history will tell how the enrollment in aviation classes skyrocketed in a few short months from a few hundred students in a handful of pioneer high schools to an enrollment of several hundred thousand; how an army of teachers prepared themselves to teach the new courses, by attending summer session classes, by enrolling in the Civilian Pilot Training Program, and through individual study; some even were assigned to teach aeronautics with no time for preparation. Copies of book and pamphlets have flowed from the presses by millions in record-breaking time to meet the new demand for classroom materials.

The high schools have accepted the challenge of a job to be done and wholeheartedly have responded both to a wartime need and to a genuine interest on the part of youth growing up in a world becoming rapidly air-minded.

The problems confronting the teacher who undertakes to plan and teach a course in aeronautics are many. The aims of the course are different, the subject content is almost entirely new, methods and activities best suited to the students and to the nature of the learning necessary in aeronautics still are unknown. Aeronautics is truly a new course. As the course develops, the first few years will see much groping and experimenting before the answers to the problems of teaching aeronautics at the high school level are found. It is encouraging, nevertheless, to see so much that is worth-while already being done in a field so new to teachers and administrators.

The primary purpose of this article will be to discuss those aspects of teaching a course in aeronautics which are of major concern to the teacher. An attempt will be made to indicate some of the better practices observed in the various high schools and to make suggestions that may be helpful to those planning the course content, selecting and devising materials of instruction, and organizing classroom activities.

WHAT are the aims for a course in aeronautics? The aims as proposed by the Civil Aeronautics Adminis-

tration and the United States Office of Education are stated largely in terms of outcomes. The objectives can be expressed conveniently and significantly in the double-barreled terms devised by Alexander Inglis in 1918, namely, social-civic, economic-vocational, and individualistic-avocational. As the war continues, the nation is faced with training the 2,300,000 personnel asked by General George Marshall for the air forces by the end of 1943. Of course, the two million men are not all to be pilots or even flight personnel. But all of them need at least one basic course in the fundamentals of aviation.

With air supremacy an absolute necessity for victory in this war, it becomes imperative that the nation train enough men to fly, navigate, service, maintain, and fight the armada of planes scheduled to be produced by the end of 1943. The logical place where the future air force personnel should receive its primary academic training in aeronautics is in the high school. The wartime social-civic goal of a course in aeronautics is, then, to speed up the training of those students who will soon be members of the army, navy, or marine air forces. Incidentally, the various branches of the armed forces are in full accord with the plan to introduce aviation education in the high school.

The economic-vocational objective is concerned with the long-term view of aviation education. If this nation is to win the peace to follow the successful conclusion of the war, it must educate its people to participate intelligently in a world that has become air-minded overnight—at least in terms of war strategy. We must educate now for the job of reconstruction to come later. If aviation is not to go into a great slump after the war, we must train young men to study realistically the problem of putting the airplane to practical use in peaceful pursuits.

Up to the beginning of the war, flying was only for the relatively rich; cargo consisted of such things as flowers, ladies' hats, medicine, securities, and mail. Aviation will not flourish as a social function until the average business man and the man on the street find the airplane a useful economic asset. To keep the hundreds of thousands of pilots, mechanics, and skilled aircraft workers on the job after the war will require a market for the airplanes to be produced. To create a market requires a public cognizant of the economic possibilities of the airplane. The high school can serve to give the academic basis for such a requisite.

The third general objective for an aeronautics course, which can be called "individualistic-avocational," calls for providing the opportunity for every boy and girl in the eleventh and twelfth grades who is interested in aviation, and who has the requisite ability, to enroll in an aviation course. Such an objective is predicated upon the belief that the secondary school program is planned to respond to the genuine needs, interests, and abilities of the students.

In terms of specific outcomes, a course in aeronautics should be designed to do one or more of the following:

1. To aid the student in acquiring those skills, abilities, appreciations, habits and knowledges essential to a practical understanding of aerodynamics, air navigation, meteorology, aircraft engines, aircraft construction and design, and the civil air rules and regulations.

2. To prepare the country's youth to pass one or more of the CAA examinations. In December, 1942, the CAA announced its decision to make available to qualified students of aeronautics examinations on aeronautical knowledge. The student who passes these examinations will be awarded the CAA Certificate of Aeronautical Knowledge and will be credited with meeting the ground school requirements for a Private Pilot Certificate. The examinations will be given by a representative of the CAA upon the request of the school author-

ities and will be voluntary on the part of the student.[1]

3. To introduce the student to the present and future problems of aviation and to help him to realize what the impact of the airplane will be upon our civilization. Economic, political, and social aspects of aviation should be considered along with the problems of science.

WHICH students do and should take the course in aeronautics? At present most aviation courses in the high schools are designated "Preflight Aeronautics," with preferential enrollment for those students who have a background in mathematics and physics, or for those who are taking physics concurrently with aeronautics. Most of the enrollees are boys who plan to become flight officers in the air forces.

Such preflight courses, however, do not include many boys and girls who cannot qualify because of the prerequisites but who will become engaged in aviation work for which a basic course in aeronautics would be a decided asset if not direct vocational training. There are many glider pilots, flight engineers, fighter pilots, aerographers, and the like in service today who did not have a thorough background in mathematics and physics. This does not mean that a background in mathematics and science is not worth-while. It does mean, however, that there is a place in aviation for students who do not have a comprehensive background in mathematics and physics but who should have the opportunity of aeronautical training in high school.

WHAT are source materials for the course? Although aviation teaching materials are new to the high school curriculum, the science of aeronautics is well established and aeronautical knowledge has become so extensive that a single course can make but an introduction to the field. Most of the textbooks, manuals, government bulletins, and magazines until recently were not written for students on the high school level.

One of the first steps to be taken by the CAA to advance the teaching of aeronautics was to have suitable textual materials prepared for elementary and for high schools. In less than six months the Air-Age Education Series [1-20],[2] consisting of sixteen texts and reference books and four teacher manuals, was ready for distribution throughout the country. Many teachers and specialists from various schools and colleges made up the staff of the research groups that selected the materials for classroom use. The two texts [3 and 5] and the accompanying teacher manuals [4 and 6] are comprehensive in scope and, considering their low cost, provide excellent and economical written material for a course in preflight aeronautics.

Literally scores of other books designed for high school use have blossomed forth recently. The general text by Pope and Otis [28] was one of the first to appear and lends itself particularly well to an academic treatment of aeronautics. Many textbooks are limited to one or two phases of aeronautics and should serve as excellent reference books. Although most texts have a glossary of terms, a more complete dictionary and thesaurus has been prepared by Baughman [22], whereas Jordanoff [24] has just completed his illustrated aviation dictionary. The abundance of good reading matter resolves the problem of written source materials to one of search, review, and selection.

Of visual aids there also is much from which to choose. Scores of motion pic-

1 For complete information, write to Frank Lindsay, State Department of Education, Sacramento.

2 Numbers in the text enclosed in brackets refer to titles in the bibliography.

tures are available from the various film distributing agencies, and more are being produced. It should be said, however, that many of the films are old, too technical, or cover such a small area of learning that they are hardly worth their rental. Caution should be exercised to learn as much as possible about each film in order to select the films best adapted to classroom use. If obtainable, recent films produced by the United States Army Signal Corps [32] can be used to great advantage.

For the projection type aid having the highest teaching value, a workshop group of teachers selected the *Pilot Training Kit* of film strips [29], consisting of 24 film rolls and containing over 1,700 frames of 35-millimeter size. This set contains a wide range of essential subject matter which is vividly presented in a way that makes it easy to learn. The fact that the strips must be purchased is an added value inasmuch as they are available to the teacher when they are most useful for learning purposes and can be shown as often as they are needed. *The Pilot Training Kit* has been endorsed enthusiastically by many teachers using it; the film strips also are widely used in the war training service of the CAA, as well as in the Army and Navy preflight training.

Numerous government bulletins, pamphlets, and technical manuals provide another abundant source of pictorial and written materials. The twenty official photographs of cloud forms provided by the United States Weather Bureau in the wall chart, *Cloud Forms* [33], is worth many times its cost of 5 cents, to mention only one example. Many other references to government publications are given in the bibliography reference [9] of the Air-Age Series.

Probably one of the most prolific sources of worth-while teaching aids in aeronautics is the mass of pictures, diagrams, articles, and stories to be found in everyday magazines and newspapers. Surely no teacher has failed to notice the excellent portrayals in *Life* magazine in recent months. The article on map projection [27] was in such demand that a special reprinting has been made for distribution. Aviation magazines such as *Air Trails, Flying,* and *Aviation* contain "live" materials geared to the interest and reading ability of the students. No text has presented the important but technical topic of air mass analysis as clearly and as forcefully as did a recent article in *Harpers* [25].

When Sikorsky tells about the possibilities of the helicopter in the *Reader's Digest* [31], when Ayling writes "The Truth About Air Power" [21], and when the story of "The Magic of High-Octane Gas" [26] is told by an ace reporter in *Harpers,* the teacher has the opportunity to inject into the work of the course authentic up-to-date materials interestingly written. Even the magazine sections of the Sunday editions of the newspapers have featured map projection, aviation stories, and the history of aircraft.

Last September there appeared on the market an eight-page aviation magazine especially written for classroom use and published by the same company that prints *Current Events* and *Current Science.* The new magazine is called *Current Aviation* [23]. This periodical presents each week a subject matter lesson in classification of aircraft, aerodynamics, meteorology, and navigation, replete with diagrams, pictures, cartoons, and quizzes. It should prove to be a worth-while aid to learning if properly articulated with the class work. In one school over one-half of the student body takes *Current Aviation,* and each student pays for the subscription out of his own pocket. Certainly every boy and girl should have the oppor-

tunity to read this magazine whether he or she is taking a course in aeronautics or not.

Up to the time of writing there has appeared but one workbook on aeronautics for high school use [30]. It presents realistic exercises and laboratory-type work in a series of "problems." Review exercises in arithmetic, algebra, geometry, and trigonometry are provided, as well as a student inventory and objective tests. Perhaps the outstanding features of the workbook are (1) the full-size, colored aeronautical chart which uses the same symbols and markings as the Coast and Geodetic Survey charts (now unavailable) and (2) the new weather codes and station model necessary for reading United States Weather Bureau maps and reports. Since August 1, 1942, the United States Weather Bureau changed its system of symbols, which means that most texts do not include the new codes.

WHAT are the activities and content of a course in aeronautics? The aeronautical knowledge examinations required by the Civil Aeronautics Board for the private pilot certificate are based on the following Civil Air Regulation:

> Applicant shall be familiar with and accomplish satisfactorily a written examination covering so much of the provisions of Parts 01, 20, and 60 as are pertinent to his certificate,[3] prevailing weather conditions in the United States as encountered in flying, and the forecasting thereof, the analyzing of weather maps and sequence reports as furnished by the United States Weather Bureau, practical air navigation problems and the use of maps, navigation by terrain (pilotage) and by dead reckoning, including the use of instrument and other aids to navigation in visual contact flying, and the general servicing and operation of aircraft.[4]

Two very pertinent observations with implications for teaching aeronautics in the high schools are contained in the above statement. With reference to course content the regulation calls for a study of meteorology, air navigation, civil air rules, and general servicing and operation of aircraft, the latter including a study of aerodynamics, engines, and aircraft structures. Of particular note is the stress placed on navigation, meteorology, and civil air rules and the secondary emphasis given to aerodynamics. This does not mean that aerodynamics is unimportant to a study of aeronautics. It simply means that a useful knowledge of meteorology, navigation, and air rules is more important for a basic preflight course in aeronautics.

There is little doubt that, for the present, the adopted textbook is playing a major part in determining the course content. One text places a great emphasis on a certain phase of the work, while another text devotes but a few pages to it. If the course is to function as an aid to preflight training, then the learning outcomes most useful to future pilot training should be the criteria for content selection. What is needed, of course, is an investigation to determine the specific subject-matter content, the kind and proficiency of skills, the appreciations and attitudes, and the nature of the abilities that can be taught and learned in the high school and that at the same time will be most useful to a student in aviation training. Some indications of what should be done, such as those cited in the CAB regulation, are already known; more guide lines must be discovered and implemented into the program to make functional teaching of aeronautics possible.

Stated in simple terms, the subject-matter should be such that the student learns the fundamentals of how an airplane is constructed, what makes it fly,

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[3] Parts 01, 20, and 60 are civil air regulations relative to air traffic, air worthiness, and pilot certification.

[4] *Civil Air Regulations*, Civil Aeronautics Board, Washington, D. C.; part 20.125.

how it is controlled, how weather conditions affect flying, how communication is maintained during flight, how the pilot finds his way from one place to another, and the rules of safety in flying. In addition, the social significance of aviation, the new geography, and vocational opportunities may be included.

The second observation to be noted in the CAB statement of aeronautical achievement requirements is the stress placed on skills and abilities. "Weather forecasting," "analyzing of weather maps and sequence reports," "use of maps," "use of instruments and other aids," denote outcomes achievable through much practice and actual experience and not merely through a memorization of facts. To learn how to use an aeronautical chart, for example, involves such skills as reading contours, scaling distances, deciphering symbols, interpreting colors and markings, and measuring bearings. The kind of activity by which the student may gain a competence in map reading, weather forecasting, and the like, must include laboratory-type work involving first-hand experiences with actual full-size aeronautics charts, the daily United States weather maps, et cetera. Aircraft maneuvers, identification, and nomenclature can be meaningfully studied when the learner has a model plane in his hands.

Unfortunately, a full determination of the knowledges, skills, abilities, attitudes, and appreciations of most functional worth to the preflight trainee and the classroom activities by which these outcomes may be achieved has not been made. Some indication of what is needed is given or implied in the CAB statement quoted above; a fuller understanding will come to the teacher who accepts the functional viewpoint and seriously attempts to implement the viewpoint in planning the work of the course.

IT soon becomes obvious to the teacher or to anyone who even peruses the scope and nature of the work usually assigned to a one-year course of aeronautics that an effective job of preflight aeronautics training needs the coöperative aid of other courses and departments of the school. Such aid need not necessarily be in the form of additional content to other courses. It is mostly a matter of directing the emphasis and the application of the usual learning to problems in aviation.

For instance, the geometry teacher can help by emphasizing the accurate measurement of angles and distances and by applying the measurement to problems involving bearings, scaled distances, and velocities. Social studies can include civil air law along with the usual study of state and federal laws; geography will find the study of maps more profitable by including the polar and Lambert projections. The shop departments can coöperate by making various kinds of demonstration models and equipment. General science classes will find the study of weather much more interesting when applied to flying, and new life will be added to English courses by the introduction of aviation vocabulary.

In this way a student will become acquainted with many of the elements necessary to an organized study of aeronautics. The result of such procedures is to increase interest of the students and provide motivation for their learning. Moreover, many teachers have reported that they have been experiencing some of the easiest and most enjoyable teaching in their entire careers since they began "aviationizing" their courses. The materials for such instruction can be located readily; there is much to choose from in the twenty

volumes of the Air-Age Series [1-20].

Certainly the schools cannot afford to ignore the present-day opportunity to respond to the keen, natural interest of youth in aviation, an interest capable of motivating a student to greater heights of achievement. To direct this motivating force into profitable channels of training requires planning and study on the part of the teacher. The effort expended, however, will go far toward training a youth capable of fighting effectively until peace comes again and toward educating a new generation to participate intelligently in the aviation era which has already begun.

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Projected Visual Aids in Chemistry Classes

By MARTIN BRAUTI

That 75 per cent of the high school chemistry teachers in California are using projected visual aids in their classes was discovered by Mr. Brauti in a recent study. Just what types of aids they are using and how they are using them are some of the other findings from his investigation which he reports in the accompanying article.

Mr. Brauti is director of visual aids and instructor in science and mathematics at Newport Harbor Union High School, Newport Beach. Formerly he taught chemistry and physics at the Washington Union High School, Fresno, where he was co-chairman of the visual aids committee. Before coming to Fresno, Mr. Brauti had taught science and had had administrative experience in the schools of Oregon. His hobby is photography.

MODERN educators recognize the fact that if instruction is to become meaningful, visual aids must be used to enrich and to vary the pupils' concrete experiences. The chemistry teacher long has used some forms of visual aids as instructional material; yet projected visual aids only recently have found a definite place in the schoolroom to aid the teacher in making the abstract in chemistry more concrete.

Realizing, then, the value of these modern teaching techniques, the writer made an investigation (1) to find what projected visual aids are being used in the teaching of chemistry in the public high schools of California; (2) to locate the sources of these aids; (3) to obtain the teacher rating of the aids used; and (4) to determine the current practices and techniques in their use.

The data for this study were obtained from a four-page questionnaire filled in by 50 per cent of the 240 chemistry teachers contacted. Since the teachers who contributed represent a cross section of both rural and urban communities, it is assumed that their responses are representative of the status of projected visual aids in the teaching of chemistry in California.

Projected visual aids in this study are referred to as sound motion pictures, silent motion pictures, film slides, film strips, lantern slides, and photographs and specimens projected upon the screen by mechanical means.

THE study has revealed that 75 per cent of the chemistry teachers reporting are using projected visual aids in some form and that those teachers who for various reasons are limited in the use of these devices express a definite desire to include them as supplementary instruction. Only two teachers consider these visual aids of no value to their courses of study.

Even though sound films are preferred, the silent motion pictures, because of availability, are used more frequently. Of the various types of projected aids, 11 per cent of the instructors use only silent motion pictures, and 4 per cent use only sound pictures. Twenty-four per cent of all the teachers project both silent and sound motion pictures as aids to instruction. Thus, it is found that 39 per cent are using motion pictures and no other type of projected visual aid. Thirty-six per cent, however, make use of silent and sound films together with some combi-

nation of projected stills. It might be pointed out further that unless the chemistry teacher incorporates motion pictures as supplementary material for the course of study, little use is made of projected stills.

Projected stills, on the other hand, are not used extensively and in only rare cases is there still any extensive use of them. Only one teacher uses all four types of still projections. Film strip and film slides are the types used most often; yet only 27 per cent of the instructors use them. Twenty per cent use lantern slides; 10 per cent, opaque projections; and 10 per cent, projected micro-slides.

It is interesting to learn that even though but a few make use of projected stills, those that do use them do so to supplement nearly every topic in the chemistry course. It would seem, therefore, that the teacher limited because of the expense of motion picture equipment can enrich the course in chemistry by the ingenious use of still projections. Some teachers suggested that micro-projections might be further developed and used as a profitable teaching technique since this device enables one to project objects and actions which are difficult to project by other means.

IT was generally agreed by those responding that there are many sources from which the chemistry teacher might select projected visual aid material. Among the sources suggested are corporations, universities, and the United States Bureau of Mines. Teachers mentioned that lists of projected material contained in certain textbooks and textbook guides also offer helpful guides to sources.

As one might expect, sound films receive a higher rating from the chemistry teachers than do silent films. Eight sound films were given a decisively superior rating while only one silent motion picture received such a rating. It would seem, too, that available films for the most part are acceptable for classroom work; for out of all the silent and sound films rated by teachers in this study, only one film was rated poor and that rating was made by only one teacher. Inasmuch as more films do not receive a superior rating, however, it appears that teachers are accepting the films available, but desiring better ones.

TEACHERS use various methods for introducing, presenting, and following up motion pictures, as follows:

Introducing motion pictures. The most popular method of introducing films to a class is through an overview by the teacher of the material to be projected. This method was mentioned by 52 per cent of the teachers. The next two most commonly used methods are the assignment of outside reading on the topics to be covered by the film and the demonstration of a similar experiment to the one in the film. The former method was submitted by 22 per cent of the instructors and the latter by 19 per cent. Twelve per cent of the teachers require the students to make oral reports on the topics to be covered in the film.

Methods used for presenting films. Teachers are about equally divided in their opinions concerning the showing of one or two reels during a single class period. Thirty-one per cent prefer to show one reel, while 30 per cent prefer to show two reels.

Teachers favor the showing of one topic during one class period, but there are times when the situation demands that they show films covering more than one topic.

A single presentation of a film is the general practice. Forty-nine per cent of the teachers usually show a picture to the class one time, while 23 per cent

project a given picture to the class two times. Many teachers who prefer to show the same film to a class a second time are unable to do so because of the film schedule they are forced to keep.

One teacher, who had made a study of the number of times to show a picture profitably, reports that two separate projections of the same picture give the most economical returns for the time spent. He has found also that a third showing of the same film tends to bore rather than to instruct students.

Follow-up procedure. A class discussion of the contents of the film immediately after the class has viewed the picture is the most frequently used method of following up. It is interesting to find that 58 per cent of the teachers follow the film showing by class discussion of the contents of the film; 27 per cent give a test on the contents. Only 3 per cent of the teachers show the film without providing for any follow-up procedure.

The other methods of follow-up submitted by the individual teachers vary. A written report or summary of the facts seen in the film, a demonstration of a similar experiment as seen in the picture, and a repetition of the showing at a later date with an accompanying test, were suggested by a number of respondents as being valuable follow-up procedures.

IN the light of the findings of this survey, which reveal that 75 per cent of the teachers of chemistry are using projected visual aids in various ways to enrich the course of study, it is easy to see that considerable progress has been made in this field of education. The cry heard from almost all of the teachers who are not now using projected aids is that they, too, would willingly use projected visual aids to make the abstract in chemistry more concrete if only the school districts would provide the necessary equipment.

New Publication Reports Claremont Reading Conference

Included in the *Claremont Colleges Reading Conference Seventh Yearbook* (published by Claremont Colleges Library, Claremont, California, 1942; 355 pages mimeographed; $2.50); are forty articles which were presented at Claremont's last annual reading conference. The array of contributors is an imposing one, and the numerous articles omit practically nothing that interests the superintendent, supervisor, or teacher who is concerned with cultivating the ability of the pupil to gain meaning from symbols. Reading in the various grade levels; how to teach reading to bright, average, and dull pupils; techniques for the average classroom; psychological and physiological factors important in the acquisition of reading skill; and reading tests—these general captions indicate the nature of the contents of this volume.

Readers of the JOURNAL are aware that a State committee on reading was appointed approximately three years ago. Members of the southern section of this committee took an active part in the conference, conducting daily sessions in which they discussed the pertinent problems of reading and demonstrated techniques and materials for the teaching of reading.

Dr. Peter L. Spencer of Claremont Colleges, with the local chapter of Pi Lambda Theta, organized the conference and produced the yearbook.

Oakland Introduces Credit Study Halls

By FERDINAND DIEL

FOR the past two years the Oakland Public Schools have been giving credit to students taking a study period. It was for the purpose of finding whether giving credit for study has a noticeable effect on grades, discipline, and study habits that a survey was made of the grades received by the students of Technical High School over a period of two years, one year preceding and one year after the study-hall plan had been in effect.

Before credit was given, study halls often became catch-alls in that no discrimination was made as to who could enter them. As a result, the student personnel was composed of various types, most of whom wanted to study, but many of whom either did not need study or did not care to use their study period profitably. As such situations occurred, the intention of giving students time for preparing lessons in study hall was defeated to a great extent, for the latter two types of students were a disturbing element and prevented the others from benefiting fully from the study period.

It was partly to correct the above situation that credit study halls were put into operation in Oakland. The major purposes, however, were to provide a study room with an atmosphere conducive to good study habits, to provide information for and help the student in forming good study habits, to aid the student in his studies with a certain amount of coaching by the study hall supervisor, and to foster an appreciative understanding among the students of the importance of study.

To elaborate on this last point, credit for study hall can be justified in that it can be called a work credit. The work done in credit study halls is effort spent in preparation of subjects which require time outside of regular classroom work. If this preparation is done in an organized manner, recognition can and should be given to it.

Students at Technical High who are enrolled on a full-time basis in study and who meet the necessary requirements are given half a credit, which is the same amount that is earned in any other subject taught in school. If enrolled only part of the time, they receive only partial credit. Credit earned in study counts toward their fulfilling the number of credits necessary for graduation. It must be said, however, that

Writes Assistant Superintendent William R. Odell: "I am sending you herewith a statement which expresses our point of view in Oakland concerning study halls and describes our plan of giving credit for students who take study hall in order to study. From our point of view, this has been a very significant departure, and we are quite convinced that it is a sound procedure."

Mr. Diel, who writes the article, is a counselor and teacher of social studies at Technical High School, Oakland. He also is chairman in charge of study halls. When he first went to Technical High, he supervised from 500 to 700 students in study halls daily. Out of his dissatisfaction with the inadequacy of this sort of teaching arose his interest in a new plan. Before going to Oakland, Mr. Diel taught in the Kingsburg Union High School.

the number of credits necessary for graduation also has been increased.

Students in study are graded on a two-point basis: "S" for satisfactory or passing, and "U" for unsatisfactory or failing. Grades are based on three definite points of merit: First, the student's attendance record in study is taken into consideration. Unexcused absences or tardinesses must be considered, because if the student is absent he loses time from his studying. Second, his citizenship in study hall is important; for if the student fails to cooperate and becomes a nuisance, not only is he wasting his own time, but he is disturbing the other students. The third and perhaps the most important point concerns the factor of working during the study period. The mere fact that the student is enrolled indicates that he has subjects which require preparation. If the student habitually wastes his time, he is not earning his credit.

PRELIMINARY to actual operation of the study halls on the basis of credit, some guiding principles were necessary. A study hall committee composed of three members met with the principal, the vice-principal, and the teachers who had study halls. The rules that resulted from these meetings were incorporated into the study hall "plan." This plan contained an outline for the organization of the study halls, as well as procedures for their operation. Some of the points in this plan are unique to the study hall situation as it exists at Technical High; therefore, only the general phases of the organization and operation of the study hall plan will be presented here, together with the results and conclusions arrived at as the result of the survey.

It was necessary in the beginning to decide which students could or could not be enrolled in study. Naturally the study halls were to be open to all students who had subjects in which study outside of regular class was necessary. Since our school has two different types of study rooms, it was possible to make different entrance requirements for each type.

A library study room which is connected with the school library is, first of all, open for permanent enrollment to those students who have subjects requiring reference work. Other students who have subjects with study, but not necessarily reference requirements, can be enrolled if necessary. Individuals or student groups who have been given reference assignments related to classroom work can be accommodated for certain days. These students can come from classrooms or from another study, but they are not permanently enrolled in library study. Class groups, also, can be sent into the library for special assignments if arrangements are made by the subject teacher.

The other study room is open to all students who have subjects in which outside preparation is necessary, but who do not have regular reference work.

Certain types of students, those who do not help to create or maintain the conditions necessary therein, are considered ineligible for enrollment in credit study hall. These students include such as are dismissed from classes for disciplinary reasons, those who do not participate in group activities, those who are sent from class because they fail to meet regular classroom conditions, and, of course, those who are not programmed for subjects requiring outside preparation.

IN order to make the supervised credit study hall function to the greatest advantage, it is important that the counselors, the study hall supervisors, and the subject teachers work together.

Each one of these groups has definite duties in making the study halls run successfully. It is the duty of the first to segregate the students; the second must supervise the study halls; and the last provides information requested by the study hall supervisor when necessary, concerning the progress of the students in classroom work.

At Technical, in order to make sure that only those students who really need to study are assigned to study hall, we prepared a chart which lists every subject taught in school. Each subject is labeled according to how it falls under the following categories: (*a*) demanding preparation with reference work; (*b*) having homework every night; (*c*) having occasional reference work; (*d*) requiring some homework; and (*e*) requiring no study. Of course one subject may fall under two classifications.

These charts are given to the counselors to be used when programming students. In this manner many students who take subjects requiring no outside preparation are eliminated. This information is not only of value to the counselors in programming students, but it is important in that a student can be shown in writing that he should not be programmed for study when his subjects do not require it. Subjects such as English, history, mathematics, science, and shorthand require outside preparation, while typing, cooking, clothing, shop, and art do not.

UPON the study hall teacher depends whether or not the study hall is successful. His work is a full-time job. The study teacher must attend to his study hall duties, taking no time from this period to do his other school work. Supervising a study hall is not the same as having a conference or free period; therefore teachers who have one or two study classes a day with other classes that demand preparation must have their teaching loads reduced accordingly.

The duties of the study hall teacher may be classified into three different parts. First, it is his job to take care of routine functions, such as taking the roll, issuing permits to leave, checking absence slips, and maintaining discipline and quiet necessary to study. Second, the study hall teacher is to serve: (1) by being available to study hall students at all times; (2) by putting his knowledge and abilities at the disposal of the students; (3) by permitting students to study together, if he deems it advisable (at times this can be accomplished best by permitting two students to go to a separate room); and (4) by giving the information as to how to study for certain subjects. Third, the study hall supervisor must see that the students use their time wisely and efficiently.

This latter duty can be done best if he has a seating chart containing the students' names, subjects with teachers' names, and the name of the counselor of each student in the study. From the subjects taken by the student the supervisor can see readily what kind and approximately how much outside preparation is necessary. If the student wastes too much of his time, a request can be sent to his subject teachers, asking how the student is getting along in his classes. Usually the answer is that he is doing poorly. The study hall supervisor and the subject teachers then can investigate the student's difficulty. If this step does not bring results, the counselor may be consulted. If this pressure on the student still is insufficient to bring about better study habits, the counselor contacts the home. Discipline cases are discussed with the dean of boys or the dean of girls.

At the end of each grading period the study hall committee furnishes the study hall teachers with a list of names

of those students who are enrolled in study and who have failed or received incompletes in other subjects. These lists can be used as a guide when the teacher talks to the students about improving their study habits.

The classroom teacher plays an essential part in making the entire plan function smoothly. It is important that definite and specific study assignments be made in subjects that are designated as having outside preparation. If the assignment requires reference material, the student should be told where and how to find it. Training in study procedures and techniques such as note taking, outlining, use of the *Reader's Guide,* et cetera, is given. When this preparation does not bring desired results, the subject teacher checks with the study hall supervisor to determine the student's difficulties and to arrive at methods for overcoming them.

SINCE the system of giving credit for study has been in effect, proportionately fewer students are enrolled in study hall. The students who have been eliminated from study are now enrolled in other classes.

A class which was started at Technical partly for the reason of taking care of students eliminated from study halls is Leisure Reading. In this class the students are permitted to read books of various types, mostly novels. Since the room where the class meets is not a circulating library, one book serves six students during the day. A book is reserved by a student for the same period each day until he has completed it. Students do not make book reports.

Several changes have been made in Leisure Reading since the course was instituted. When the class was first started the students spent the full period reading books. It was soon found, however, that some students need to study about fifteen minutes a day, but not every day. Accordingly, study now is permissible in Leisure Reading. Also, several of the more popular magazines have been added to be read at certain times. The students in Leisure Reading, like those in study halls, are given S for satisfactory and U for unsatisfactory and receive half a credit for full-time enrollment.

AFTER the system of credit study halls had been in operation for some time, we decided to discover whether or not there were any changes in the grades received by the students taking study hall and those who were not taking study; for if this policy of segregation was not bringing beneficial results, some changes in policy or operation would be necessary.

Accordingly, a study was made of the total A, B, C, D, F, and P[1] grades received by the students over the two-year period, 1940-41. A total of 41,000 grades received by students taking and not taking study were tabulated according to a variety of classifications: according to year, according to sex, according to attendance in study hall, and so on.

Data were interpreted largely in terms of percentages since the total school enrollment suffered a decrease of more than 100 students from 1940 to 1941. Analysis of the data for the 1940-41 period brought the following conclusions:

1. In terms of total school enrollment, the percentage of students in study halls decreased, as a result of segregation.

2. The boys in the new type study halls showed improvement in their grades (in comparison to the grades of boys in study halls before the new plan was started)[2]: the per-

1 "P" stands for passing, this grade being given in some of the slow classes.

2 In all of these conclusions, percentages of improvement or of want of success are stated in terms of a comparison of the grades of students in a certain category after the new plan went into effect with those in that same category before the new plan was inaugurated.

centage of F's and D's decreased, while the percentage of C's, B's, and A's increased.

3. The boys not in study showed a greater increase in good grades than in poorer grades.

4. The girls in study improved in that they received a smaller percentage of F's and D's and C's, while B's increased and A's remained the same.

5. The girls not in study dropped in their grades, for they increased in F's and D's, decreased in A's, and only increased in C's and B's.

6. The combined grades of boys and girls taking study showed improvement throughout.

7. The combined grades of boys and girls not in study improved in part and dropped in part.

8. The grade of B increased in all groupings.

9. The increase in better grades was greater than the increase in poorer in the grand total number of grades.

In considering the changes in the total percentage of grades, there is one change which may be classified as being significant—the B grades increased 2 per cent. The C grades increased by .7 of 1 per cent, while the A grades decreased .9 of 1 per cent. In these three groupings combined there is an approximate 2 per cent increase.

The percentage increase in B grades at first appraisal may not seem so great. It must be considered, however, that over a period of time, proportionately the same number of F's, D's, C's, B's, and A's will be given by teachers to the students in their classes. The fact that there is an improvement, and that this 2 per cent improvement approximates 410 grades, and affects the grades of one student out of every ten, makes it more impressive.

THE number and percentage total of each grade gives a picture of results achieved during the two years for which they were tabulated. Some results from the operation of the study hall plan, however, cannot be shown in figures, except as a summary of questionnaires which voice the opinions and observation of teachers conducting a study class. From such questionnaires it is apparent that: (1) the problem of discipline in the study halls has practically disappeared; (2) the general attitude of the students toward study has improved, this tending to bring about an atmosphere conducive to the formation of good study habits; (3) since there are now fewer students in study hall, each student has proportionately more time to receive assistance, if needed, from the study hall teacher; (4) the students who were in study and who now are in Leisure Reading or in a sixth subject are learning additional subject matter; and (5) by having a unified study hall plan, a teacher who for the first time supervises a study hall has definite procedures to follow.

In anticipation of a question as to whether the improvement in the grades of the students in study was made possible by keeping on the better students and eliminating the poorer ones, it can be said that not all the better students are in study halls. Students who make a grade average of B in their subjects are allowed to take a full program of solids without study. This naturally eliminates from study many of the better students. Consequently, it can be said that the students in study are there because their program demands supervised preparation outside of class and that the improvement is due, at least partially, to the supervision received in the credit study halls.

It is realized, of course, that there are some problems which still must be solved in connection with the management of study halls, but the results of the program to date are truly gratifying.

Teachers Need to Learn How To Play

By LESTER TURNBAUGH

THE public school teacher—leading for the most part an indoor life, an existence fraught with those thousand-and-one daily annoyances that sap the nervous energy of the best of us—certainly has need for frequent physical exercise, best obtained in games, mental relaxation that thrives in the spirit of fun, and a spiritual rebirth that comes to one in the soothing quietness of being alone in the great outdoors.

Teachers often say, "I cannot find time for the physical exercise and recreation you suggest to me." But one is safe to reply that a teacher who spends an average of two hours a day in a total combination of physical exercise in the outdoors and mental relaxation obtained through the various types of recreation with fun predominating will do more and better work in any given twenty-four hours than the teacher who spends the same two hours continuing at her daily tasks or bemoaning the fact that she is worn out.

And you and I know that a healthy, optimistic wide-awake teacher with a humorous disposition and a zest for living can do wonders in the classroom and is eagerly sought for membership and leadership in the various community organizations.

And you and I know also that, in spite of our wishing it were not so, every teacher is an example to her students and to the community at large of a model way of life. Far too many of us have wasted our energies trying to teach in the classroom the fundamentals of healthy living while our own mental and physical lethargy have been loudly proclaiming the opposite. It is indeed high time that we teachers go into action and really live the healthy lives we so warmly recommend for others.

Military and civilian authorities have impressed on us the importance of enlarging and intensifying the public recreational service during these days when we are at war. In any such work, certainly it is the teachers of America who must provide the leadership in developing and staffing an adequate program of recreation. The present article, therefore, is quite timely. Mr. Turnbaugh is a good one to write it, also, since he has been so active in his own community during recent years in conducting a recreational class in folk dancing (which was described in detail in the October, 1940, issue of the "Journal").

Mr. Turnbaugh is district superintendent of schools at Chowchilla.

"Heaven ne'er helps the man who will not act," said Sophocles. Huxley has so wisely proclaimed that "The great end of life is not knowledge, but action." Let us then, as educational leaders of healthful living, plunge right into purposeful action in our own communities. It is our duty, and at this particular time our patriotic duty and our high privilege, to show not only the boys and girls but the men and women of our sphere of influence how to play.

BUT if you are one of those unfortunate individuals who either never really learned how to play, or who has forgotten through years of neglect these soul-reviving practices, you may wonder how to begin. Let us suggest some

sources. You will need to pick those that will most nearly fit your needs.

First, see to it that you really become proficient in some type of large muscle activity to the extent that you derive keen enjoyment from it. It may be tennis, volleyball, basketball, baseball, badminton, hiking, bicycling, or some other game. Second, learn to play a variety of indoor games—the type where you really can let your hair down, forget your dignity, and laugh, and be human. As a Southern woman once told a group of us at a convention when we asked her where she got so much pep and how she was able to arouse so much fun in others: "You-all must just let yo'self go!"

Get several good books on folk dancing. Learn as many different dances as you can. Develop your ability to see the humorous side of things.

Why do we mention all these? Simply because to be a recreational leader in your community you must yourself practice these rather wide varieties of activities. And let no one tell you that you cannot do these things. Maybe you can't if you are not willing to try. Maybe you are not physically able to do some, but that will not keep you from trying the others.

If you can generate an abundant supply of enthusiasm you are well on your way to success. Bruce Barton once said: "If you can give your son only one gift, let it be enthusiasm." Years before Barton's time, Emerson declared: "Nothing great was ever achieved without enthusiasm."

Avail yourself of every opportunity to take part in recreational activities. For too long we Americans have had an acute case of spectatoritis. For too long we have been willing to watch the other fellow play. Possibly we did get a little lung and throat exercise in this way. But you and I know that we cannot read our way to good health.

Neither can you by reading all the good books on the subject train yourself to be a good recreational leader unless you learn through many hours of actual participation to love the game, to throw off the tenseness that accompanies newness to any activity, and to play in the spirit of fun and relaxation. And keep in mind that the true spirit of recreation is playing for the fun of it rather than to attain perfection or to win. This does not mean, however, that slovenly or lazy-like performances in any activity should be tolerated.

The black race probably takes life easier than any other race under the sun. Their philosophy in part is exemplified by the observation of a small negro who had been questioned as to his age. "Well," he said, "if you count by what my gran'mammy says, I'se gwine on ten; but if you count by de fun I'se had, I reckon I'se 'bout a hundred."

NATURALLY, in the space available there is not room to outline a detailed course that might be used in preparation for recreational leadership. Nevertheless a few suggestions may prove helpful.

Why not ask your high school administrator to make arrangements for an adult class in training for recreational leadership. Then both high and elementary teachers of that vicinity might meet one to two nights a week to pool their resources and, particularly important, to practice games, dances, contests, and the many other varieties of fun and recreation. This class should have available a half-dozen or more good books on folk dancing and several on games, stunts, and various other types of activities—lists of books and pamphlets of this kind may be obtained from our own Division of Physical and Health Education here in Sacramento. It always must be kept in mind, how-

ever, in a class of this kind, that much more time should be spent in actually dancing the folk dances and in playing the games than in merely talking about them or discussing them.

It might be said here parenthetically that on one occasion in our own high school where for some years we have been teaching an adult class in folk dancing, there were no fewer than twenty-five public school teachers in attendance—and this had not been announced as a special night of any kind. It is our experience that teachers are anxious for this opportunity, not only to learn folk dances for their own amusement and relaxation, but in order that they may teach students and adults in their own communities. Many hundreds of students have learned the fun of folk dancing because their teachers themselves experienced this fun in our adult folk dancing class.

If you are already trained, so much the better. If you need this training, get it somehow. Then may you receive the joy of service that those of us who have been taking the lead in activities of this kind have experienced on many occasions. "This is the finest thing that ever happened to this town," is an expression frequently heard in regard to the folk-dancing class we hold in our town. Another is, "I have been living almost next door to that man for years, and I did not really know him till the folk-dancing classes started." A wife once said: "What have you done to my husband? He used to be so shy and I could scarcely get him to go anywhere. Now he really knows how to have fun, and he meets people easily." "My goodness," declared another lady, "that is the first time I have known those two men to speak to each other in years, and there they are laughing and romping together like two kids."

May we add, too, that many an evening the recreational leader will have to approach the task of leading a group of folk dancers when he feels completely worn out. He wonders how on earth he is going to appear before them vivacious, peppy, enthusiastic. But once the music begins and he faces those people eager to be led into an hour or two of carefree activity, his weariness slips off. He is in a world completely separated from the petty annoyances of the day's routine. You, too, will be surprised at the strength and courage the group can give you.

SO organize your fun night, your recreation classes, your folk-dancing groups. Give the adults of your own particular community the type of recreation they want, and prepare yourself to lead them in it. And do not forget that you cannot stand off to one side and tell them what to do and how to do it. You must be in there doing it yourself, enthusiastically, happily, radiating the spirit of "come join us, we're surely having fun."

In closing, may it be said that when you get more pleasure from a good physical workout yourself, from playing the game with others in the spirit of fun and give and take, than you get from a carousal, a cocktail party, or an all-night card game in a smoky, stuffy room, then you are really on the road to health. When you obtain vastly more pleasure from playing the game than from watching it, when you can play the game so earnestly and enthusiastically as to forget for the time being all your cares, when you are able to pass on to others some of that enthusiasm for physical and mental recreation and to lead them into a keen enjoyment of letting themselves go in the spirit of hilarity, then you are well on your way to being a successful recreational leader.

And you will also find that you have acquired for yourself a well-rounded, healthful, soul-warming zest for living.

Science Teaching for War And Peace

By MYRON S. ALLEN

Because he thinks that science students should be better thinkers as a result of their training, Dr. Allen emphasizes in this article the need for utilizing instructional methods that will result in the growth of reflective thinking—a need that is fundamental in peace as well as in war. In the article, the author illustrates his point by use of certain data which were secured in a study involving over 1,000 students in six Southern California junior colleges.

Dr. Allen is an instructor in physics and aerodynamics at the Long Beach Junior College, where he has been for the last fourteen years. He is the author of "Junior College Physics," published in 1939.

THE transition from a rather self-satisfied and aloof physics curriculum, which stresses primarily the accumulation of information, to one that will serve the immediate needs of the war emergency presents many problems that may not be solved purely on the basis of past experience. The need is very urgent, and there is no time to carry on extensive experimentation, the results of which would serve as a guide to the curriculum changes desirable. For the above reasons no apology is made for presenting to readers of the JOURNAL some proposals which, although based on extensive investigation, in some measure exceed the limits of proof by experience.

War is insanity, and nothing good may be said in its behalf. But since this madness has been thrust upon us, it would seem the part of wisdom to profit by what it can teach. As psychologists frequent insane asylums and homes for the feeble-minded to witness in an exaggerated form evidences of personal characteristics which might pass unnoticed in less extreme cases, so may educators turn to the war to find emphasized some weakness in the customary teaching of physics.

DOES there need to be any difference in a college physics course that prepares for war and one that will be adequate for the peace to follow? An examination of army and navy manuals, and other service literature, reveals much the same subject matter items as are included in any standard textbook of physics. The answer is found not in what men in the service know but in what they are called upon to do. A soldier is expected to be able to concentrate on the job at hand and to think completely through his problem under any conditions in which he may find himself. These requirements for success in war are no different from those for success in peace.

The handwriting on the wall for academic physics teaching has been written in flaming letters for some time, but the warning has been neglected. The United States Office of Education[1] is authority for the astounding statement that the enrollment in high school physics classes shows the lowest net gain and the lowest percentage gain of all sciences over the period 1928-1934. Available figures show as high as 75 per cent drop-outs in the first three

1 Carl A. Jessen, "Registrations in Science," *School Life*, 22:314, March, 1937.

semesters of a two-year engineering physics course. Obviously some changes must be made in the physics curriculum if the present boom-time enrollment is to be retained after the emergency is over. If the change is not to be made in the basic subject matter, it can take place only in instructional procedures and course organization.

THE practice of concentration and sustained thinking, suggested earlier in this article as being a fundamental requirement for success in both war and peace, is possible only when one is confronted with a problem to be solved. The need of a worth-while problem as a basis for motivation has been practiced for many years in the elementary school in such activities as building a dairy or a grocery store. Many years later in graduate work, particularly in the quest of higher degrees, the problem again becomes the center of action. But during the interim between the elementary school and graduate university work, all but the very unusual instructors appear to have forgotten that there can be no concentration without interest, or thinking without a problem in which the student may have an interest.

A recent study by the writer[2] seems to point rather conclusively to the lack of any helpful relationship between growth in reflective thinking and most of the instructional methods in common use. Some of these methods, notably the use of demonstrations and the placing of strong emphasis on mathematical dexterity, actually function in reverse ratio to the measured growth in reflective thinking. Only one teaching method, the extent to which outside references are emphasized by the instructor and written reports submitted by the student, shows a relationship to growth in reflective thinking that is positive and has statistical significance.

In the light of the foregoing discussion the reasons for these findings are not hard to see. A student looks up reference material and writes a formal report only when he has a problem to solve and the need to present his findings. Most demonstrations entertain the student; but they do not develop thinking because there is usually no problem involved. The instructor, in effect. says to his class, "I shall now do A, B, and C; D should result." If everything happens as planned, D does result and the student is "thrilled" with the repetition of some fact that probably he knows already. Because of the lack of uncertainty or of a problem, the student does not think in the course of most demonstrations—not because he does not want to, but because there is no stimulation.

In the mathematical exercises generally assigned to the student, usually he will be able to satisfy both the instructor and himself if he can find the correct equation. Probably he will not be able to complete the exercise without the equation, as he is seldom required to think out an original solution. The point to be made here is that because of the very slight demand for data to be interpreted, principles to be applied, or choices to be made, reflective thinking is not called for; and of course it will not be developed if it is not exercised.

TWO plans of procedure in the practice of the problem approach have been used by the writer. The first is the utilization of a large number of independent and limited specific problems; the second is the use of a very small number of broader, more inclusive problems.

Examples of the first type of problem statements are, "How would you

[2] Myron S. Allen, "An Exploratory Study of Reflective Thinking," unpublished doctor's thesis, The University of Southern California, Los Angeles, 1942.

make provisions for linear expansion in a highway bridge if you were the designer?" "How would you construct an automatic fire sprinkler system for a factory?"[3] Two main difficulties have been found with this plan; there is great difficulty in having available, when needed, the wide range of technical magazines and books necessary, and there is an undesirable lack of continuity.

The second plan, now used by the writer, has but six problem areas. This procedure avoids the difficulties inherent in a multiplicity of problem situations. Taking all specific discussion and laboratory problems out of but six important and timely problem areas also makes possible a much richer understanding of these areas which are vital in both war and peace.

The particular problem areas selected are as follows:

1. The air-conditioning of an office building containing stores, offices, and a theater.
2. The extraction, processing, and transmission of petroleum products from oil well to ultimate consumer.
3. Electric and gas welding.
4. The operation and design of steam, gasoline, and Diesel engines.
5. The design, construction, flight, and navigation of airplanes.
6. The generation and transmission of electric power.

[3] Myron S. Allen, *Junior College Physics*, Southern California School Book Depository, Los Angeles, 1939.

These larger areas present problems that are of significant interest to nearly all types of students. For example, while an engineering student may be interested in air-conditioning primarily from the heating, cooling, or ventilating aspect of a construction problem, the medical student is concerned with the relation of health to air-conditioning. Each one might acquire much the same physics information, but this information will result in very different knowledge as the problem is developed in terms of very different interests.

THE problem approach is the democratic one, for if democracy is to persist as a way of life, the values of democracy must be respected. Regard for the integrity and worth of each individual is, in a democracy, held paramount above all others. This is necessarily true, for in a democracy the policies and values are the product of group thinking, which is simply the composite of individual thinking.

We are now engaged in a war to preserve democracy. And if both the fight for democracy and democracy itself are dependent for success on reflective thinking, which in turn is dependent on meaningful problems for one to think about, then the proper selection of worth-while problem situations well may be the heart of all physics, and in fact all science, curricula.

University Extension Makes War Films Available

With the arrival of two new films, "The Work of the Rescue Unit" and "A New Fire Bomb," both 16-mm. sound films, 800 feet in length, produced by the United States Government and released through the Office of Civilian Defense, the Visual Department of the University of California Extension Division is looking forward to servicing schools, organizations, and other groups which wish to borrow the films.

Both films are available upon application to the Visual Department, Room 301, California Hall, University of California, Berkeley, or through 813 South Hill Street, Los Angeles. There is no charge for their use. Other films distributed through the OWI, CIAA, and OCD also are available.

Current Research in the Field of Secondary Education

Reviewed by WILLIAM A. SMITH

A Comparative Study of Certain General Characteristics, School Experiences, and Later Life Adjustments of Selected High School Drop-Outs, by John Aseltine. Unpublished doctor's dissertation, University of Southern California, 1941; 377 pages.

THE unprecedented attempt on the part of the United States to supply secondary education for all adolescents, and for the most part in the same kind of high schools, has resulted by degrees in consequences the seriousness of which educators are only just beginning to sense. On the one hand, it has led to an almost tragic lowering of academic standards, thus depriving those who are to be leaders of the future of solid basic training; on the other extreme, it has deprived a large proportion of our youth of the kind of education which they genuinely need.

In spite of the intrinsic soundness of the principle of universal adolescent education, it is extremely improbable that this ideal will survive in practice in the postwar period unless fundamentally sound readjustments are made. Invectives directed against the CCC and allied agencies which have ministered to the needs of a respectable proportion of our youth rather more effectively than the cosmopolitan high school will not even remotely affect "the shape of things to come."

The most hopeful sign at present is the extent to which the youth problem is being studied and analyzed objectively. The contributions of the American Youth Commission are epoch-making, and there is much research by other agencies. Aseltine reports an exceptionally thorough study of one aspect of the problem, namely, the relations existing "between the adjustments which high school drop-outs are able to make as adults and the experiences which they had in high school."

THE subjects for the Aseltine study comprised the drop-outs from the San Diego High School during the years 1930 to 1937, nearly 1,600 students, or about one-eighth of the total enrollment for the period. Elimination of short-term transients for whom essential information was lacking reduced the number to 1,397—710 boys and 687 girls. Of this number it was possible to locate and interview 398, the interviews being carried out by trained and experienced social workers early in 1940. A careful check showed that the interviewed drop-outs were thoroughly representative of the drop-out group as a whole.

The interviewers sought information in three areas: (1) school experience (to supplement data already available in school records), (2) personal and family status, and (3) vocational experience and status. With such data in hand, Aseltine then found it necessary to set up success criteria, and, on the strength of these, to segregate the drop-outs into two subgroups, namely, (1) those who were successful in their post-school life, and (2) those who were not. These success criteria centered about health, recreational interests,

marital status and relations, and employment and occupational status and outlook. Application of the criteria resulted in the identification of seventy-three successful boy drop-outs and eighty-eight successful girl drop-outs. These were, thereupon, compared with the unsuccessful boy and girl drop-outs in respect to: (1) age at leaving school, (2) IQ, (3) race, (4) father's occupation, (5) length of school enrollment, (6) school work completed, (7) quality of school work, and (8) attitude toward school.

In addition, certain outstanding differences between the drop-out group as a whole and the general school population were noted. The comparison showed that: (1) the drop-outs left school earlier, two-thirds of them leaving before the eighteenth birthday, (2) their medium IQ was 95.5, or ten points below that of the general school population, (3) their "racial composition included a disproportionate number of Mexicans, negroes, and Italians," and (4) "a significantly disproportionate number" of them "came from homes in which the fathers were engaged in the 'over-all' occupations."

Drop-outs spent a medium number of 211.5 days in school. In terms of work completed they fell slightly short of the normal requirements of the tenth year. Failure was nine times as great as in the general school population. Less than 3 per cent made better than a C average in work completed. Their rate of progress through school was only about two-thirds that of the general school population. Only 5 per cent were enrolled in the academic curriculum. Drop-outs did their best work in the industrial and fine arts and the poorest in the academic subjects, including general requirements in English, social studies, and science. Their extracurricular experience was confined almost entirely to athletics among boys. The chief factors conditioning withdrawal from school were mobility of residence, failure, and poor home conditions.

In matters of later life adjustments, Aseltine reports the following: 95 per cent appeared to be enjoying normal health, 86 per cent were following some worth-while recreation, and 85 per cent were holding jobs of an unskilled or semiskilled character with only slight chances of raising that status. In general, 40 per cent of the interviewed drop-outs were rated successful. Success appeared to be so closely related to length of time out of school, however, that the percentage of the successful might reasonably be expected to double in another five years.

There was no significant relationship between IQ and success. "Family background as determined by race and fathers' occupations showed a significant differential in favor of the success of drop-outs of white parentage and those whose fathers held 'white collar' occupations." Finally, aside from the fact that the drop-outs had spent at least nine years in school, there was no significant relationship between school experience and success — a dubious compliment to the cosmopolitan high school!

Sex differences among the drop-outs stood out rather clearly. The girls had a "much higher percentage of success in their school work and made relatively greater progress through school." Their mean leaving age was approximately one-half year less than that of the boys. In terms of the criteria set down, a "greater percentage of girls had made a successful adjustment" to post school life, and this in spite of the fact that their school experiences had been too largely centered upon commercial work and too little upon home economics.

What's Happening in California Secondary Schools

Edited by AUBREY A. DOUGLASS

Berkeley Conference Group Makes Recommendations on Acceleration. —The problem of the acceleration of high school students by their early admission to college has recently attracted much attention. To deal with this matter the California Committee for the Study of Education about a month ago appointed a Subcommittee on Acceleration, with Dr. Merton E. Hill as chairman.[1] This committee held conferences with groups representative of high schools and colleges and also presented the problem to the three bodies dealing with the relations between the University, the high schools, and the junior colleges. These three bodies, the University of California Committee on Affiliations with Secondary Schools, the Junior College Conference Committee, and the Board of Admissions and Relations with Schools, met on Saturday, January 16, 1943, on the University of California campus at Berkeley to consider the recommendations made by the California Subcommittee on Acceleration in the previous conferences.

This group dealt particularly with the preprofessional students in medicine, dentistry, engineering, nursing, or chemistry interested in entering the University earlier than if they were following a normal sequence. A great amount of discussion was devoted to emphasizing that students who are to take advantage of the privilege to accelerate in the manner proposed should be young people of suitable maturity and intellectual capacity. In making its recommendations, the group had no wish to dictate radical changes in high school graduation requirements as set up by local boards of education or to suggest long-range changes in education. The recommendations were only in terms of the duration of the emergency.

These committees also recognized that in addition to this small preprofessional group, there are two other groups of students that must be considered: (1) a small group whose early graduation from high school would enable them to take specialized training in junior colleges and colleges in preparation for service in the war effort, either in industry or in the armed forces, and (2) terminal high school students who will not attend a higher institution, but who would be able, with a high school diploma, to enter branches of the armed forces not otherwise open to them. It was felt that the problem of the two latter groups could not properly be decided by these committees; and, therefore, the matter was referred to the California Committee for the Study of Education, which was to meet following the joint meeting. This committee drafted additional resolutions that concerned these two groups.

The attitude of the high school

[1] The membership of this committee is announced on page 7 of this issue of the JOURNAL.

people was so well expressed in a letter from Earle E. Crawford, president of the California Association of Secondary School Principals, to the chairman of the California Subcommittee on Acceleration that it is presented here.

January 14, 1943.

Dr. Merton E. Hill, Chairman
Subcommittee on Acceleration
Office of Admissions
University of California
Berkeley, California

Dear Dr. Hill:

We secondary school principals deeply appreciate the frank and sincere spirit of cooperation the University of California has shown in approaching the solution of the problem of the acceleration of high school students. I am certain that by working together, and by seeing each other's viewpoint, we shall gradually evolve a harmonious solution of this perplexing and important problem.

Whether the interests of the student and the needs of society are better served by acceleration or enrichment of the curriculum is not always an easy thing to decide. What is best for the particular student in question is the sane approach in judging any educational proposal. Scholarship is likely to be overemphasized as a deciding factor in sending youth to college earlier. The brightest students usually are the youngest. Does the student promise to make the emotional and social adjustments as well as the scholastic adjustment?

For some capable students who have shown particular aptitudes along the lines of sciences and mathematics, medicine and dentistry, and in other areas where there are war emergency needs, and who have shown sufficient maturity in their emotional and social lives, the acceleration of their high school programs and the entrance into college earlier might better serve their needs.

For most of the high school seniors, enrichment of their curricula, particularly the introduction of such preinduction courses as Fundamentals of Electricity, Fundamentals of Machines, Fundamentals of Shopwork, Fundamentals of Radio, and Fundamentals of Automotive Mechanics, would better meet their needs and the needs of the armed forces of the United States.

Our primary objective and our motive must be, "How can we best help in every way to win this war." Our army is an army of specialists. It is our duty to furnish these specialists. Some of them may be more efficiently furnished if their high school programs are accelerated so that they can enter college earlier, while the greater number of specialists may be better obtained by the introduction of preinduction courses in their high school programs.

With the acceleration of high school students comes the need for greater similarity of teaching content, techniques, and guidance procedures in the twelfth and thirteenth grades. I trust that the Affiliation's Subcommittee dealing with this subject will soon commence to function.

We are in hearty accord with Dean Frank Freeman's viewpoint relative to the experimental approach in the solution of the acceleration problem.[2] I am certain that a group of high schools in close association with the University would welcome the opportunity to engage in this experiment.

Very sincerely yours,

EARLE E. CRAWFORD.

With the above considerations in mind the conference group passed the following recommendations:

I. It is recommended for the emergency that capable students who meet the minimum standards for graduation from high school, as set up in the Rules and Regulations of the State Board of Education, and who have fulfilled the entrance requirements of the University of California, be issued a diploma of graduation and be eligible for admission to the University. It is understood that such students must obtain the recommendation of their high school principal and that they will become candidates for degrees upon successful completion of the courses regularly required for the degree in question.

II. It is recommended for the emergency that approval be given of acceptance of college work, when such college work is taken during the senior year of high school concurrently with high school work. [The committee realized that this recommendation requires the legislation now pending before the state legislature and recommended further that their viewpoint be presented to the state committee considering this legislation.]

III. It is recommended for the emergency that opportunity should be given to capable

[2] Mr. Crawford's reference is to a proposal for long range experimentation looking toward the unification of the aims and procedures of high school and colleges.

students of the ninth to the eleventh years to take additional work in order to complete the four years, nine to twelve, in less than four years.

In the above recommendations, the word "capable" is understood to refer to students of suitable maturity and intellectual capacity.

Those present at this conference were the following:

Monroe E. Deutsch, chairman, University of California, Berkeley.
Walter L. Bachrodt, city superintendent, San Jose.
Grace V. Bird, dean, Bakersfield Junior College.
Jesse A. Bond, University of California at Los Angeles.
John F. Bovard, UCLA.
William H. Chandler, UCLA.
A. J. Cloud, president, San Francisco Junior College.
Earle E. Crawford, principal, Glenn County High School, Willows.
Aubrey A. Douglass, assistant superintendent of public instruction, State Department of Education.
Hiram W. Edwards, UCLA.
Sturla Einarsson, UC, Berkeley.
Albert Elkus, UC, Berkeley.
G. C. Evans, UC, Berkeley.
William F. Ewing, city superintendent, Oakland.
Willard Farnham, UC, Berkeley.
L. P. Farris, principal, Oakland High School.
Frank N. Freeman, UC, Berkeley.
Guy Garrand, president, Adult School Administration Association.
Arthur Gould, deputy superintendent, Los Angeles City Schools.
Albert D. Graves, deputy superintendent, San Francisco City Schools.
Ralph Guilford, principal, Gridley Union High School.
Harry G. Hansell, principal, Presidio Junior High School, San Francisco.
Leslie W. Hedge, principal, Kern County Union High School, Bakersfield.
Merton E. Hill, UC, Berkeley.
John G. Howes, dean, Taft Junior College.
Rosco C. Ingalls, director, Los Angeles City College.
Harrison M. Karr, UCLA.
Edwin A. Lee, UCLA.
Dean E. McHenry, UCLA.
William F. Meyer, UC, Berkeley.
Charles S. Morris, principal, San Mateo Junior College.
Forrest G. Murdock, principal, San Jose High School.
Howard S. Noble, UCLA.
A. C. Olney, principal, Marin District Junior College, Kentfield.
Paul Pitman, secretary-treasurer, Western Association of Secondary Schools and Colleges.
Brother Ralph, assistant superintendent, Archdiocese of San Francisco.
Edward H. Redford, editor, CALIFORNIA JOURNAL OF SECONDARY EDUCATION.
Niccolaus Ricciardi, president, Sacramento Junior College.
G. Ross Robertson, UCLA.
H. A. Spindt, UC, Berkeley.
Oliver M. Washburn, UC, Berkeley.
G. S. Watkins, UCLA.
L. J. Williams, principal, Visalia Union High School.
F. Milton Yockey, principal, Technical Evening High School, Oakland.

* * *

California Committee Acts on Acceleration.—Following the joint meeting which framed certain resolutions with reference to entrance to the University of California and the relations of the University to the high schools, as mentioned in the preceding article, the California Committee for the Study of Education, which represents all the educational interests of the State, met to consider the report of its Subcommittee on Acceleration and to deal with the problem in its more general implications.

The group studied the problem of the two groups of students that had been referred to it by the joint committees and reframed the resolutions passed by the preceding conference so as to make them apply to California institutions generally. The resolutions as revised were as follows:

Ia. It is recommended for the emergency that students who meet the minimum standards of graduation from high school, as set up by the Rules and Regulations of the State

Board of Education, and who have fulfilled with recommending grades (B average) the entrance requirements for a bachelor's degree course in a California university, college, or junior college, be issued a diploma of graduation and be eligible for admission to that institution. It is understood that such students must obtain the recommendation of their high school principal.

Ib. It is recommended for the emergency that those students other than those who are candidates for college admission to degree courses, who meet the minimum standards for graduation as set up in the rules and regulations of the State Board of Education, may be issued a diploma of graduation, provided their acceleration meets an imperative need for their services in the war effort, and provided that after consideration by the high school principal it is evident that opportunities are available that are not available in the high school.

II. It is recommended for the emergency that approval be given of acceptance of college work when such college work is taken during the senior year of high school concurrently with high school work. It is recommended, in order that this provision may apply to students below 18 years of age, that appropriate legislation be passed.

III. It is recommended for the emergency that opportunity should be given to capable students of the ninth to the eleventh years to take additional work in order to complete the four years, nine to twelve, in less than four years.

The following points summarize the thinking of those participating in these conferences—first crystallized in the joint conference and later refined by the California Committee:

1. It was recognized that a selected group of students should be admitted to colleges and universities earlier than would be possible under the usual procedure, namely, by permitting such selected students to graduate from high school after they have completed the graduation requirements as set up by the State Board of Education and the entrance requirements for a bachelor degree course with a high scholarship average.

2. It was recognized that a second group of students not looking forward to college, but to training courses preparing for service in the armed forces or in industry, should be given opportunity to prepare for these courses.

3. It was recognized that the practice of permitting students who have completed the greater part of their high school work to carry senior courses in high school and freshmen courses in college at the same time should be legitimatized. This is a useful means of acceleration.

4. It was also thought very desirable to encourage the acceleration in high school of especially capable students. By *acceleration* the group was referring to a lessening of the time interval and definitely not to a lowering of quality standards.

* * *

Democratic Selection of Clubs at Oakdale.—Oakdale Joint Union High School has an extensive Hobby and Special Interest Club Program. During the present school year twenty-four clubs have been organized, with voluntary membership involving approximately 95 per cent of the student body.

Each year the Club program changes, the following technique being used to determine the clubs for the current year:

A Club Sponsorship Preference Blank first goes out to all faculty members, who indicate the first, second, and third choices of clubs which they are willing to sponsor. All of the first, second, and third choices are listed in another questionnaire called the Student Club Preference Blank. This goes to all students, who in turn list their first, second, and third choices for membership. From the preferences of the faculty and of the students, the final Club Sign-Up Blank is made.

A thirty-minute activity period each week is given over to meetings of the

Special Interest and Hobby Clubs. The program is not organized until two or three weeks after school starts and terminates several weeks before school closes.

Oakdale students are very enthusiastic about clubs and club activities, and the school has found that its club program is an excellent technique for the teaching of citizenship and the widening of avocational interests.

* * *

Studies in Junior College Terminal Education. — The Administrative Committee of the Commission on Junior College Terminal Education is completing the second year of its Continuation Study in the terminal field. Organized under the chairmanship of Dr. Rosco C. Ingalls, director of Los Angeles City College, this committee has been charged with the administration of a generous grant from the General Education Board for the stimulation of terminal offerings in junior colleges throughout the nation.

The areas in which the committee has been carrying on its work include summer workshops (1941 and 1942), conferences and other methods of implementation of terminal education, cooperative studies in nine junior colleges on various phases of terminal education, publications, and the organization of a Clearing Office Center at the Washington offices of the American Association of Junior Colleges under the direction of Walter C. Eells.

Interest in the work of the Administrative Committee has been stimulated by the fact that more and more of our young people have been completing their education in junior college. For the future, the work of the junior colleges in the field of rehabilitation becomes a serious challenge to terminal education. At present there is a demand on the part of the junior colleges for the training and development of their own consultants in the terminal fields and for the stimulation of in-service training in this work for their own faculties.

While the courses offered in terminal education vary with community needs and types of student body, and despite the fact that the junior college is not a unitary institution, the committee has found that the general problems encountered in offering terminal work are similar in nearly every community.— LLOYD D. LUCKMANN, *San Francisco Junior College.*

* * *

University of California Establishes a Reading-Study Service.—The University of California has instituted this fall a Reading-Study Service to help university students meet the intensified demands of wartime programs of study, to offer systematic guidance to entering students, and to strengthen the preparation of secondary teachers in the field of reading development. This agency, approved by President Robert G. Sproul and the University Board of Regents, should prove a valuable aid to conscientious students in improving their reading and study abilities and in raising their scholarship records.

The work of the Service is open to any student of the University on a voluntary basis. Sponsored by the Committee on Counseling and Guidance and directed by Dr. Luther C. Gilbert of the Department of Education, it is carried on by Eason Monroe, formerly of Menlo School and Junior College and Stanford University. Service centers now are operating on both the Berkeley and Los Angeles campuses.

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This program makes use of a variety of techniques and materials in the improvement of reading and study and includes both regular group instruction and individual guidance. Through

the use of standardized tests and special interview procedures, comprehensive data are obtained on the reading and study characteristics of each student. Throughout the semester each individual receives the types of instruction and guidance appropriate to his own particular needs.

During the current semester more than 125 students have participated in the Service program. Significant growth in reading and study abilities is being reported by these students. A waiting list of nearly fifty for next semester's course indicates the growing interest in the work of the Service.

Now in formulation is a plan to permit advanced and graduate students preparing for secondary teaching to use the Service as an observation and experience laboratory in reading development procedures.

Those in charge of the work of this new agency hope it will receive the interested support of secondary school administrators and teachers and that they will take occasion to recommend that high school and junior college students who enter the University take advantage of the offering.

Headquarters of the Service have been established in Room 7, California Hall, on the Berkeley campus, and in Room 22, Library, on the Los Angeles campus. Teachers may visit and observe the program on either Monday or Tuesday of each week in Los Angeles, Thursday or Friday in Berkeley.

* * *

California Junior College Instructors Attend Summer Workshops.—Nineteen California junior college instructors attended the Workshops in Terminal Education conducted last summer by the Administrative Committee of the Commission on Terminal Education.

Working with Dr. Leonard V. Koos, professor of education at the University of Chicago, in the Chicago Workshop were T. E. Connoly Jr., Stockton Junior College; James A. Callaghan, Sacramento Junior College; Glee Duncan, Long Beach Junior College; Adolph G. Stoll, San Bernardino Junior College; Ruby E. Purviance, Pasadena Junior College; and Delight Shaffer, San Luis Obispo Junior College.

At Harvard University, the Terminal Education Workshop was under the direction of Byron S. Hollinshead, president of Scranton-Keystone Junior College, La Plume, Pennsylvania. Marjorie R. McGlothin and Gertrude E. Morrison represented Pasadena Junior College and San Luis Obispo Junior College, respectively, at Cambridge.

The largest California representation was to be found close to home on the Westwood campus of the University of California. The UCLA Workshop was conducted by Dr. Rosco C. Ingalls, Los Angeles City College director. In addition to Dr. Meyers and Miss Dement who served the Workshop as consultants, the City College was represented by Dr. Imo P. Baughman, Josephine Indovina, and Julia Crary. Nearby Santa Monica Junior College sent Edward Ruenitz, Emil Toews, and Sheldon M. Hayden. Mrs. Gladys Knight Harris, Pomona Junior College, and Edwin M. Hall, Long Beach Junior College, complete the Southern California roster. President Richard J. Werner of Salinas Junior College, William R. Bullis, Salinas Junior College, and Lloyd D. Luckmann, San Francisco Junior College, represented the North.

The total attendance at the three workshops was 105. Of these, 57 were at Chicago, 30 at Harvard, and 18 at Los Angeles. Twenty-nine states and the District of Columbia are represented in the three groups. California had the largest student enrollment of any single state.—LLOYD D. LUCKMANN, *San Francisco Junior College.*

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Art for All, by Francis Grant Bartlett and Claude C. Crawford. Harper and Brothers Publishers, 1942. Price, $2.40; 271 pages.

Comprehensive Curriculum Test for Junior and Senior High Schools (Forms 1 and 2 and an 11-page *Manual*), by William A. McCall and John P. Herring. Bureau of Publications, Teachers College, Columbia University, New York, 1941.

The Use of Tests and Rating Devices in the Appraisal of Personality, by Arthur E. Traxler. Educational Records Bulletin, No. 23 (revised), Educational Records Bureau, 437 West Fifty-ninth Street, New York, 1942; 74 pages.

Jiu-Jitsu, by Frederick P. Lowell. A. S. Barnes and Company, 1942. Price, $1.00; 83 pages.

Man and His Physical World, by Dwight E. Gray. D. Van Nostrand Company, Inc., 1942. Price, $3.75; 665 pages.

Modern Chemistry, by Charles E. Dull. Henry Holt and Company, 1942. Price, $2.00; 604 + xxiv pages.

New workbooks and texts in the field of mathematics include the following:

Arithmetic for the Emergency, by G. M. Ruch, F. B. Knight, and J. W. Studebaker. Scott, Foresman and Company, 1942. Price, 64 cents; 176 pages.

Basic Mathematics, by Walter W. Hart. D. C. Heath and Company, 1942. Price, $1.52; 456 pages.

Mathematics in Daily Use, by Walter W. Hart, Cottell Gregory, and Veryl Schult. D. C. Heath and Company, 1942. Price, $1.32; 376 pages.

Mathematics for the Emergency, by C. J. Lapp, F. B. Knight, and H. L. Rietz. Scott, Foresman and Company, 1942. Price, 80 cents; 160 pages.

Mathematics Visual and Teaching Aids, by E. H. C. Hildebrandt and Lili Heimers. Visual Aids Service, New Jersey State Teachers College, Upper Montclair, 1942. Price, 25 cents; 15 pages (mimeographed).

A Source Book of Mathematical Applications, compiled by Edwin G. Olds, Lee E. Boyer, Ruth O. Lane, Nathan Lazar, and F. Lynnwood Wren. Seventeenth Yearbook of the National Council of Teachers of Mathematics, Bureau of Publications, Teachers College, Columbia University, New York, 1942. Price $2.00; 291 pages.

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